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Phoenix, AZ 85004  
602.760.2450

## TECHNICAL MEMORANDUM

3 April 2020  
File No. 132473-005

TO: Florence Copper Inc.  
Ian Ream, Senior Hydrogeologist

FROM: Haley & Aldrich, Inc.  
Mark Nicholls, R.G.  
Sarah Cooper, P.E.

SUBJECT: Quarterly Temperature Logging Summary, Q1 2020  
Production Test Facility Westbay Wells: WB-01, WB-02, WB-03, and WB-04  
Florence Copper Inc., Florence, Arizona

## Introduction

This Technical Memorandum presents the results of temperature logging of Production Test Facility (PTF) Westbay wells WB-01, WB-02, WB-03, and WB-04 during March 2020 for Florence Copper Inc. (Florence Copper) in Florence, Arizona.

Westbay wells WB-01, WB-02, WB-03, and WB-04 are located within the Underground Injection Control (UIC) Permitted Area of Review for UIC Permit R9UIC-AZ3-FY11-1 and were completed as Class III multi-level monitoring wells for the PTF (Figure 1).

Florence Copper contracted Southwest Exploration Services, LLC to perform temperature logging. Temperature logging was conducted to verify the absence of fluid movement through vertical channels adjacent to the well, in accordance with the 25 July 2019 UIC Permit Minor Modification.

## Temperature Logging Results

Florence Copper completed temperature logging of Westbay wells WB-01, WB-02, WB-03, and WB-04. Temperature runs were completed at least 4 hours apart after the wells had been shut in for 24 hours. The temperature logs were performed as listed below:

Well ID	Temperature Log Date	Temperature Log Run 1 Time	Temperature Log Run 2 Time
WB-01	3/13/2020	9:10 AM	1:10 PM
WB-02	3/13/2020	10:00 AM	2:00 PM
WB-03	3/13/2020	7:10 AM	11:10 AM
WB-04	3/13/2020	8:10 AM	12:10 PM

As-built diagrams of the Westbay wells are provided in Appendix A. The temperature logs are included in Appendix B. Daily average flow rates for the injection and recovery wells, and daily average water level elevations for the recovery and observation wells, are provided in Appendix C for the day temperature logs were conducted.

## Conclusions

The temperature logging results for Westbay wells WB-01, WB-02, WB-03, and WB-04 show no anomalies that would indicate that there is flow behind the well casings. The temperature logs for each logging event reflect similar instrument readings for both the initial and secondary runs resulting in parallel temperature traces on each of the log records for the entirety of the well.

### Enclosures:

Figure 1 – Well Locations

Appendix A – Westbay Well As-Built Diagrams

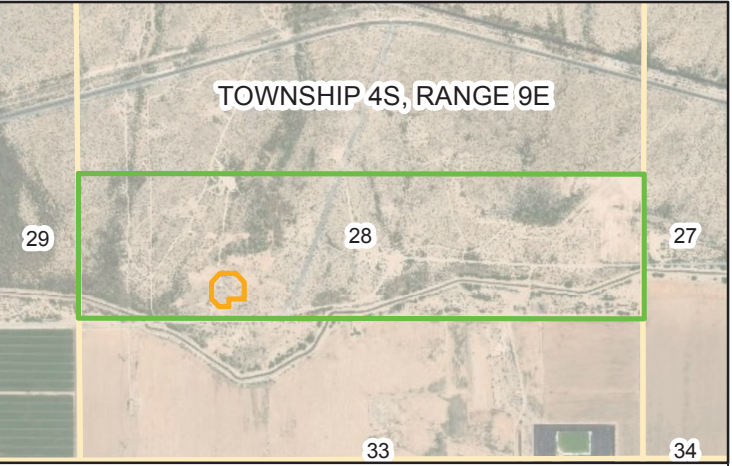
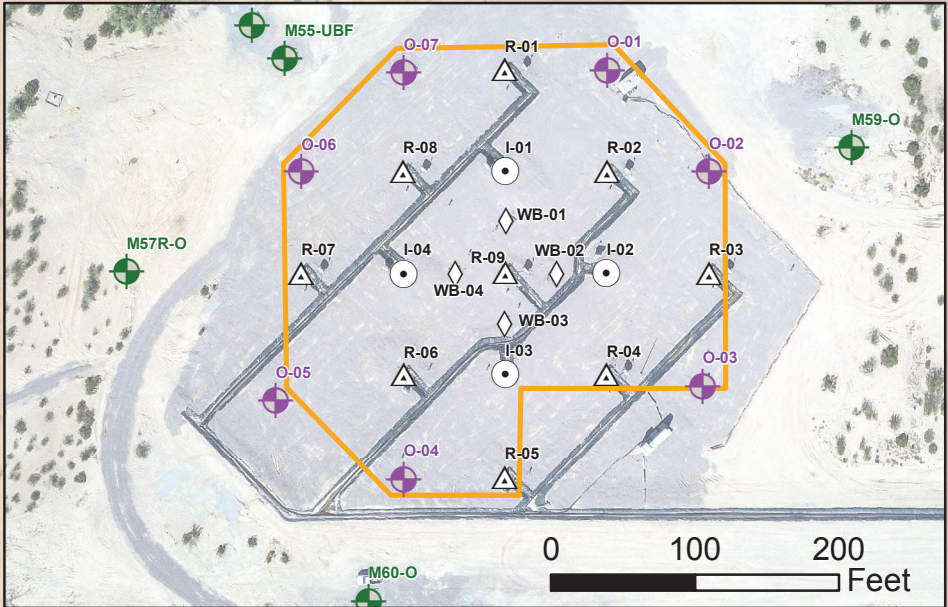
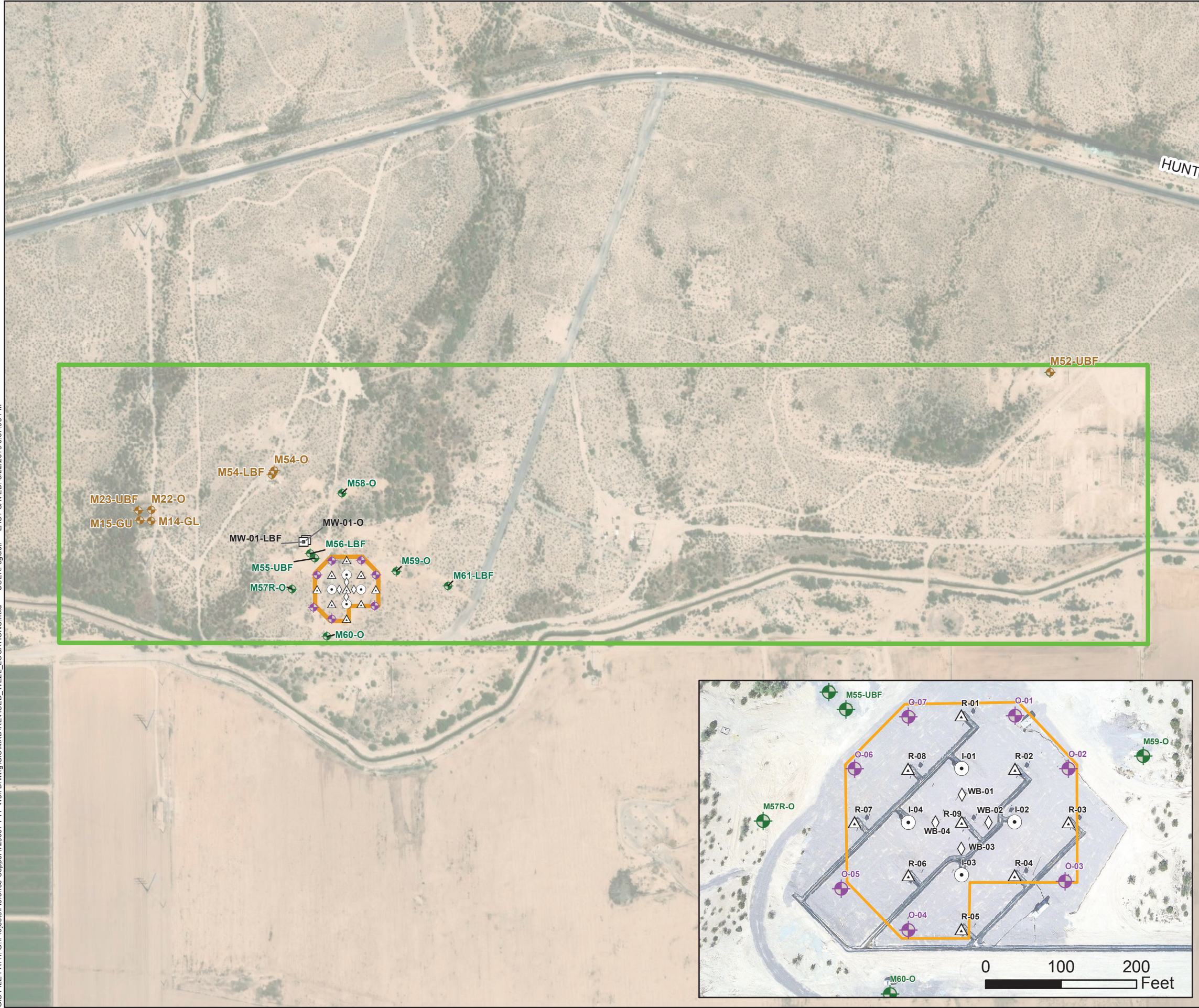
Appendix B – Q1 2020 Temperature Logs

Appendix C – Daily Average Flow Rates and Water Level Elevations

**FIGURE**



GIS FILE PATH: G:\Projects\Florence Copper\129687 PTF Well Drilling\GIS\MXD\REVISED\_WELL\_LOCATIONS.mxd — USER: cglusti — LAST SAVED: 5/22/2019 5:37:06 PM



LEGEND

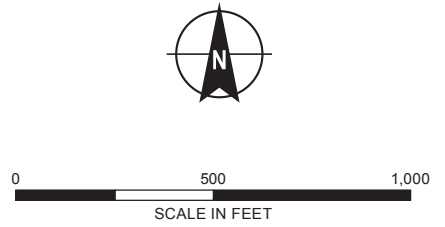
- INJECTION WELL
- RECOVERY WELL
- WESTBAY WELL
- OPERATIONAL WELL
- OBSERVATION WELL
- SUPPLEMENTAL MONITORING WELL
- POINY-OF-COMPLIANCE WELL

STATE LAND LEASE

PTF WELLFIELD

NOTES

- ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE
- AERIAL IMAGERY SOURCE: ESRI



HALEY  
ALDRICH

FLORENCE COPPER PROJECT  
FLORENCE, ARIZONA

WELL LOCATIONS

FLORENCE  
COPPER

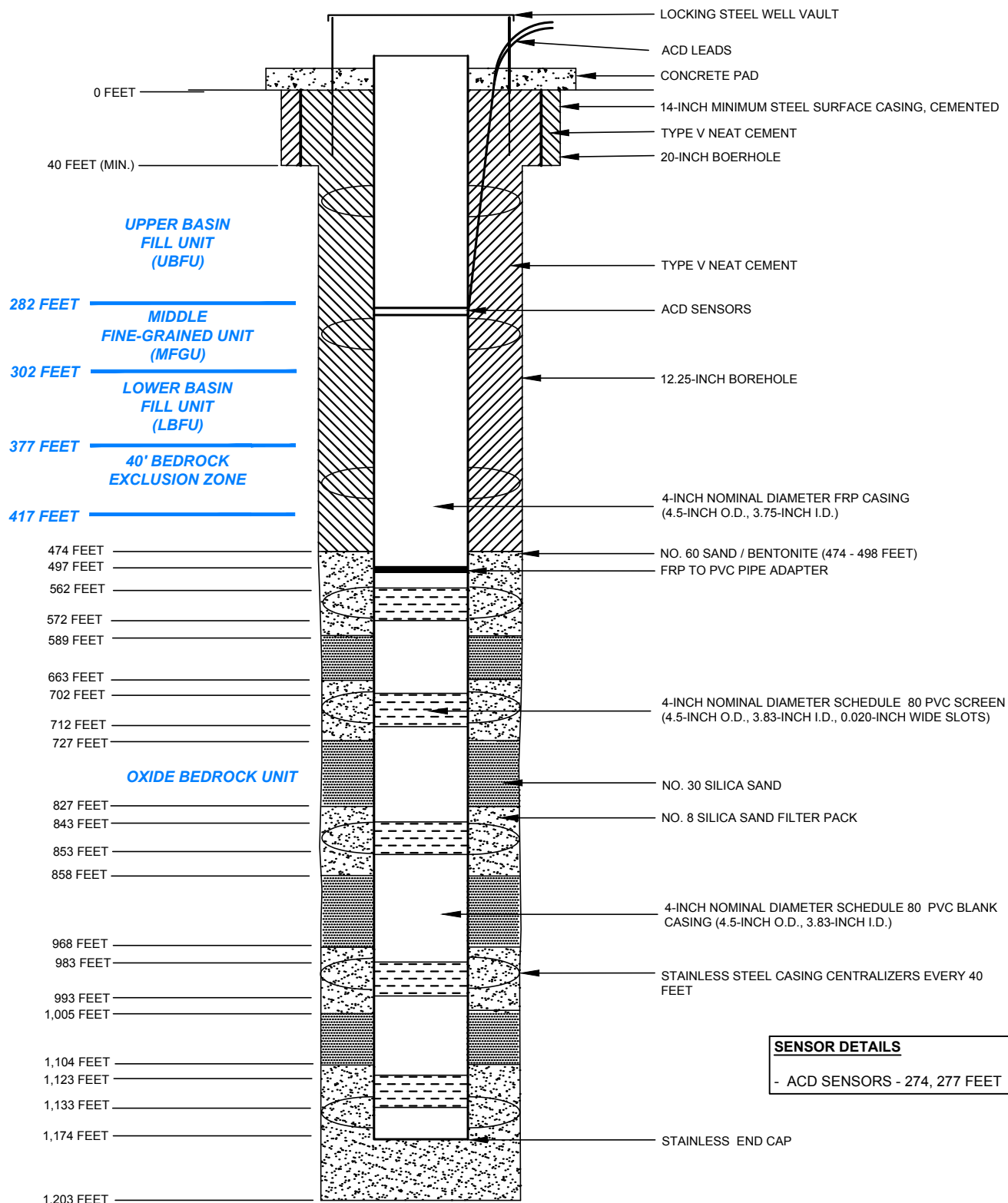
MARCH 2020

FIGURE 1



## **APPENDIX A**

### **Westbay Well As-Built Diagrams**



#### NOTES

1. WELL REGISTRATION NO.: 55-227226
2. CADASTRAL LOCATION: D(4-9) 28 CAC
3. MEASURING POINT ELEVATION: 1479.34 FEET AMSL
4. I.D. = INSIDE DIAMETER
5. O.D. = OUTSIDE DIAMETER
6. PVC = POLYVINYL CHLORIDE
7. FRP = FIBERGLASS REINFORCED PLASTIC
8. ACD = ANNULAR CONDUCTIVITY DEVICE
9. DOWNHOLE EQUIPMENT INSTALLED BY WESTBAY INSTRUMENTS

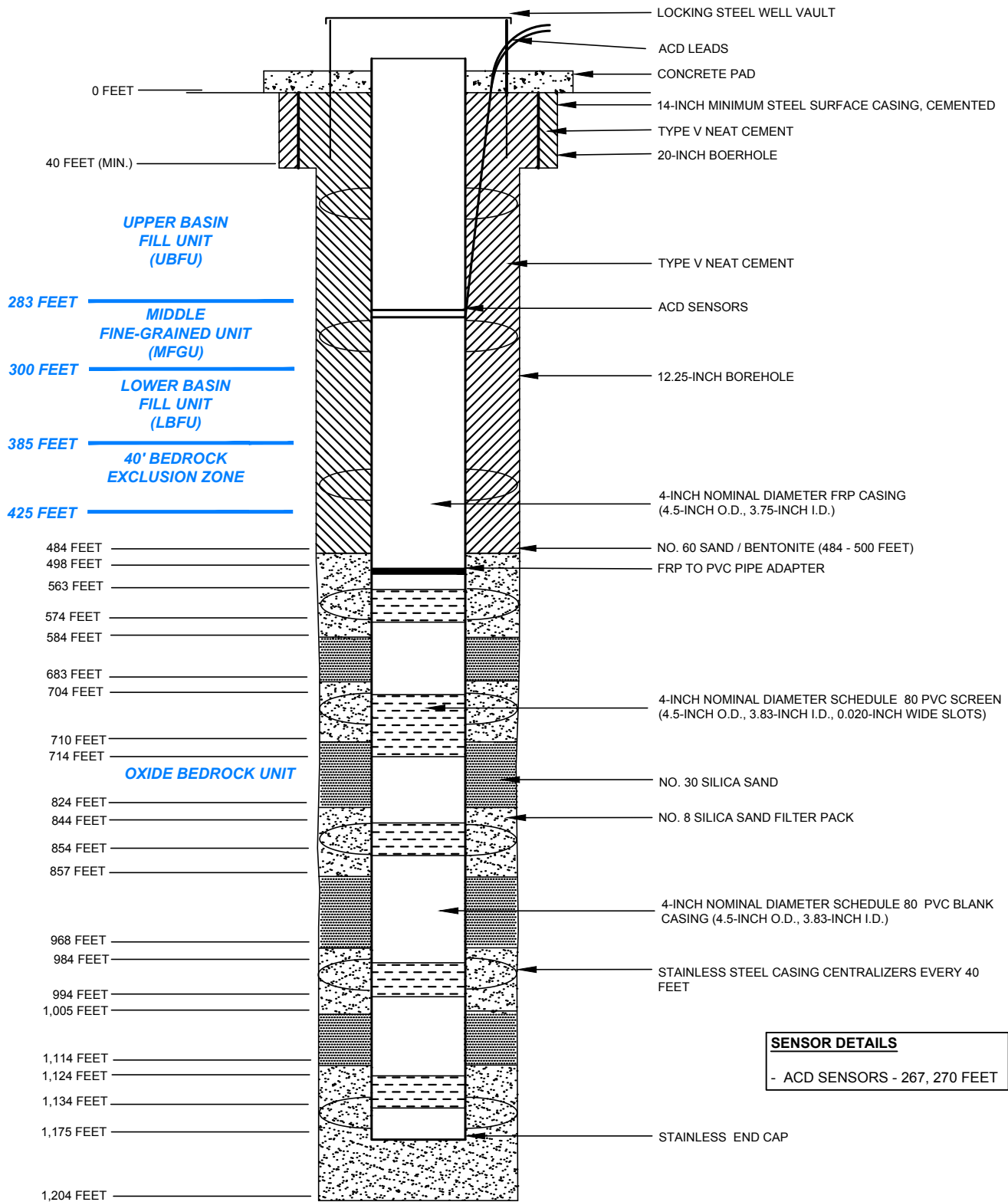


PRODUCTION TEST FACILITY  
FLORENCE COPPER, INC.  
FLORENCE, ARIZONA

#### WB-01 WESTBAY WELL AS-BUILT DIAGRAM



SCALE: NOT TO SCALE  
SEPTEMBER 2018



#### NOTES

1. WELL REGISTRATION NO.: 55-227227
2. CADASTRAL LOCATION: D(4-9) 28 CAC
3. MEASURING POINT ELEVATION: 1478.75 FEET AMSL
4. I.D. = INSIDE DIAMETER
5. O.D. = OUTSIDE DIAMETER
6. PVC = POLYVINYL CHLORIDE
7. FRP = FIBERGLASS REINFORCED PLASTIC
8. ACD = ANNULAR CONDUCTIVITY DEVICE
9. DOWNHOLE EQUIPMENT INSTALLED BY WESTBAY INSTRUMENTS

**HALEY  
ALDRICH**

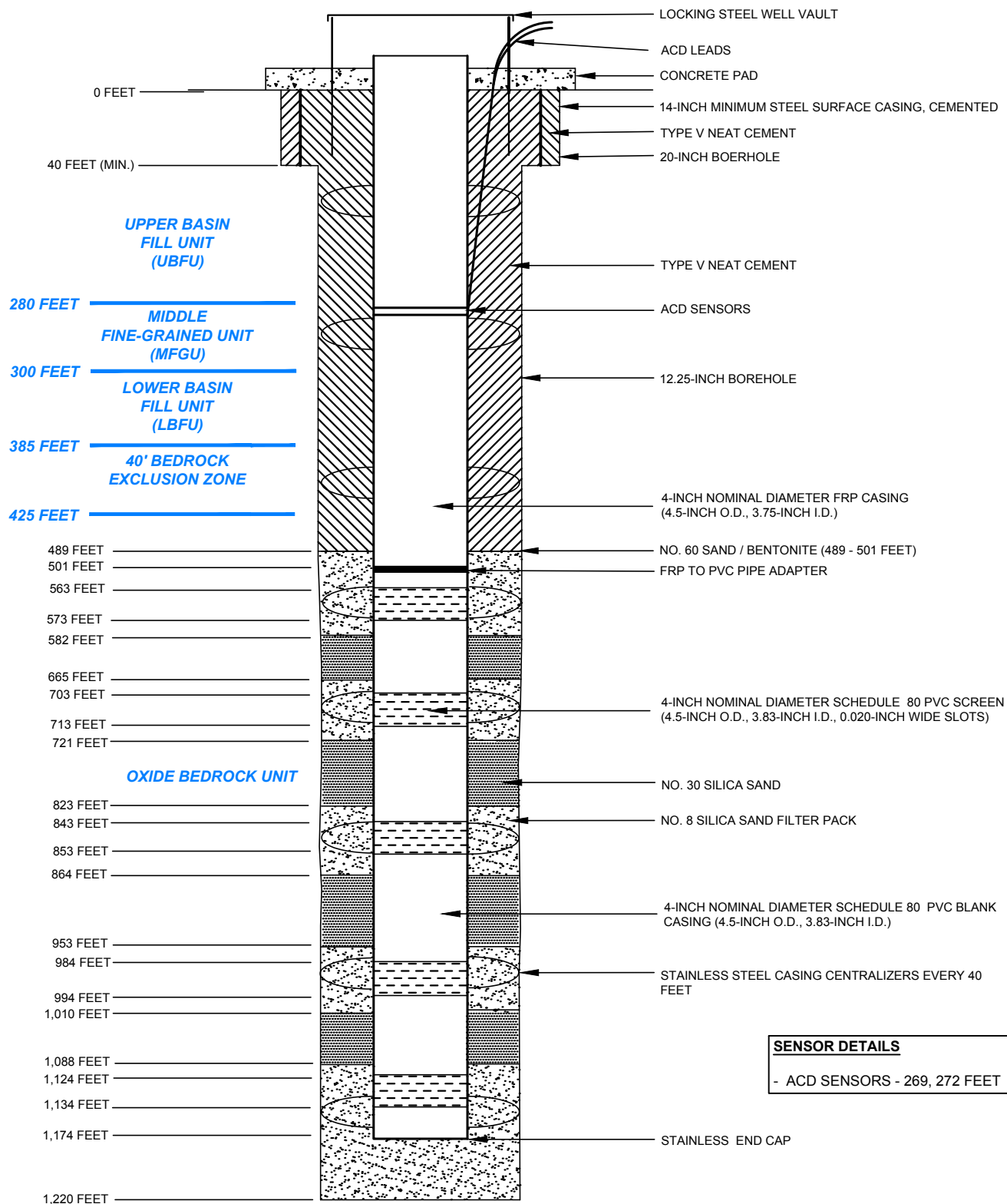
PRODUCTION TEST FACILITY  
FLORENCE COPPER, INC.  
FLORENCE, ARIZONA

#### WB-02 WESTBAY WELL AS-BUILT DIAGRAM

**FLORENCE  
COPPER INC.**

SCALE: NOT TO SCALE  
SEPTEMBER 2018

FIGURE 2



#### NOTES

1. WELL REGISTRATION NO.: 55-227228
2. CADASTRAL LOCATION: D(4-9) 28 CAC
3. MEASURING POINT ELEVATION: 1478.99 FEET AMSL
4. I.D. = INSIDE DIAMETER
5. O.D. = OUTSIDE DIAMETER
6. PVC = POLYVINYL CHLORIDE
7. FRP = FIBERGLASS REINFORCED PLASTIC
8. ACD = ANNULAR CONDUCTIVITY DEVICE
9. DOWNHOLE EQUIPMENT INSTALLED BY WESTBAY INSTRUMENTS



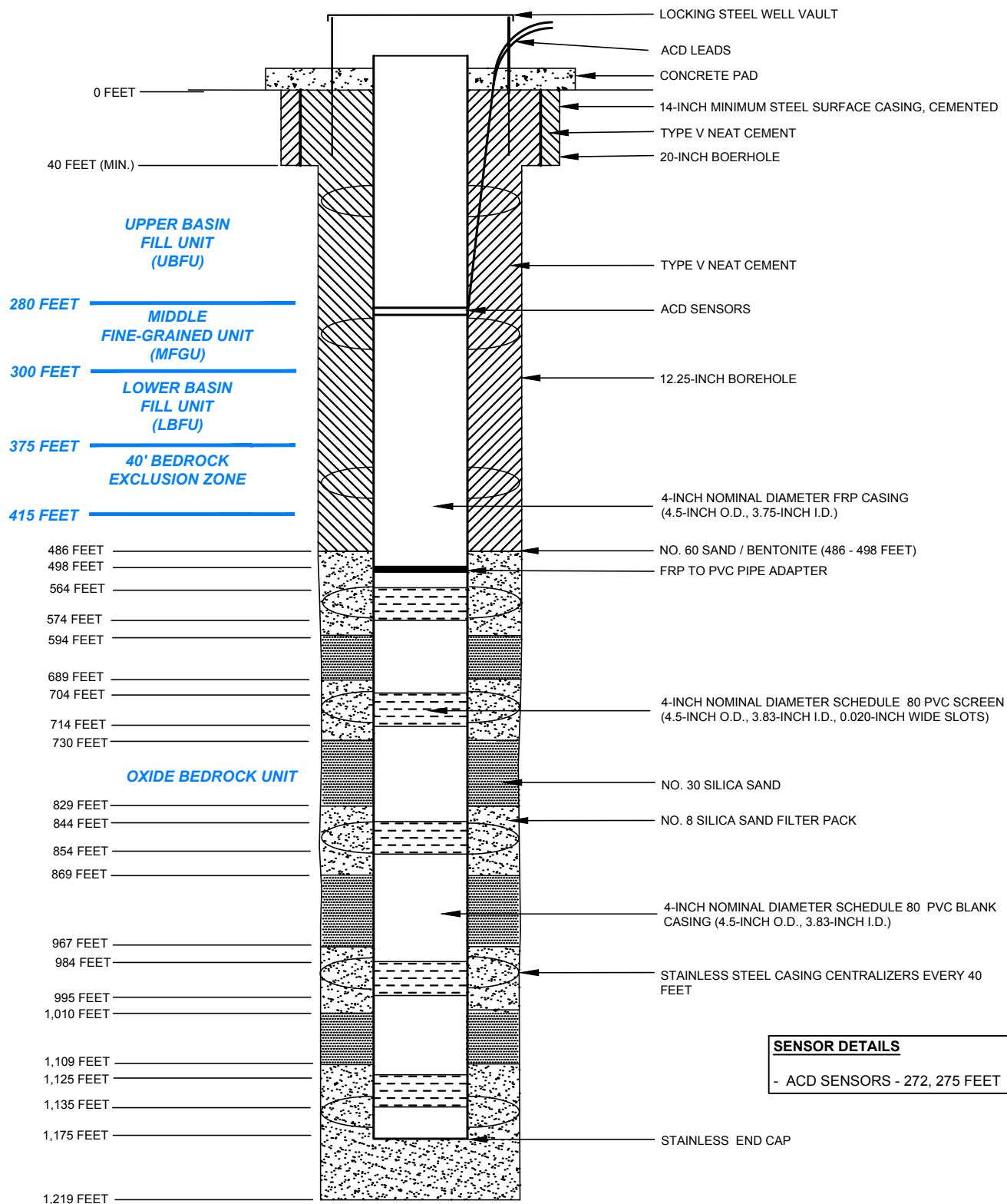
PRODUCTION TEST FACILITY  
 FLORENCE COPPER, INC.  
 FLORENCE, ARIZONA

### WB-03 WESTBAY WELL AS-BUILT DIAGRAM



SCALE: NOT TO SCALE  
 SEPTEMBER 2018





#### NOTES

1. WELL REGISTRATION NO.: 55-227229
2. CADASTRAL LOCATION: D(4-9) 28 CAC
3. MEASURING POINT ELEVATION: 1479.79 FEET AMSL
4. I.D. = INSIDE DIAMETER
5. O.D. = OUTSIDE DIAMETER
6. PVC = POLYVINYL CHLORIDE
7. FRP = FIBERGLASS REINFORCED PLASTIC
8. ACD = ANNULAR CONDUCTIVITY DEVICE
9. DOWNHOLE EQUIPMENT INSTALLED BY WESTBAY INSTRUMENTS



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 FLORENCE, ARIZONA

### WB-04 WESTBAY WELL AS-BUILT DIAGRAM



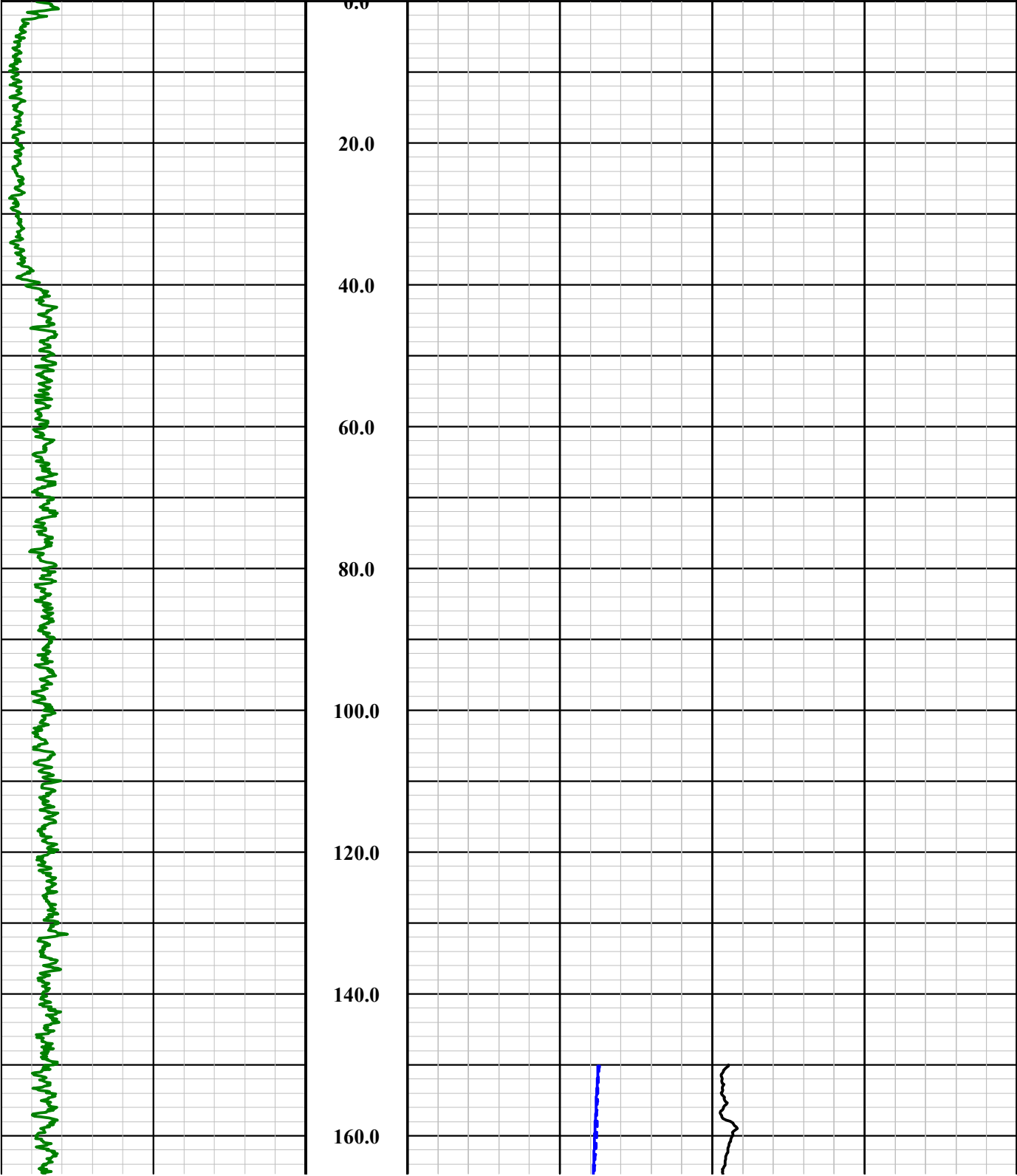
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 SEPTEMBER 2018

## **APPENDIX B**

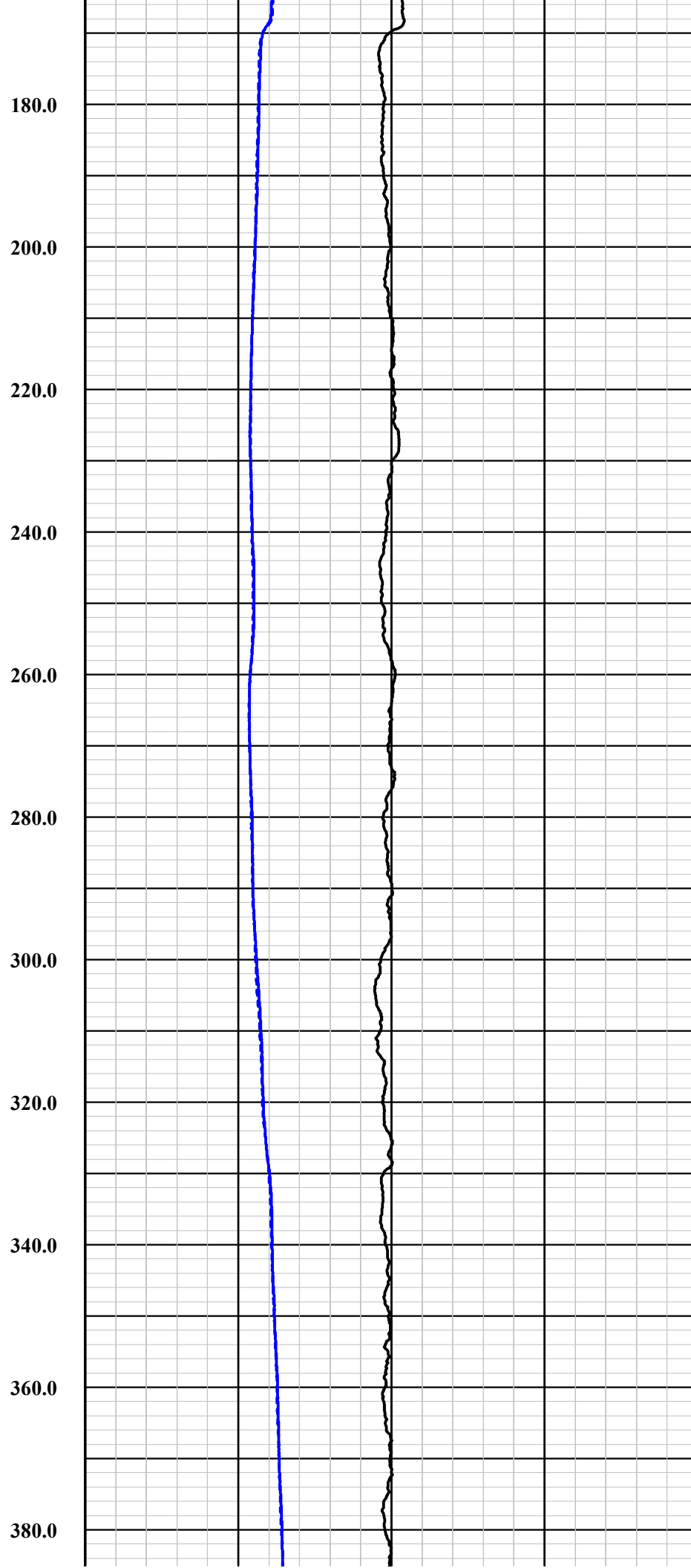
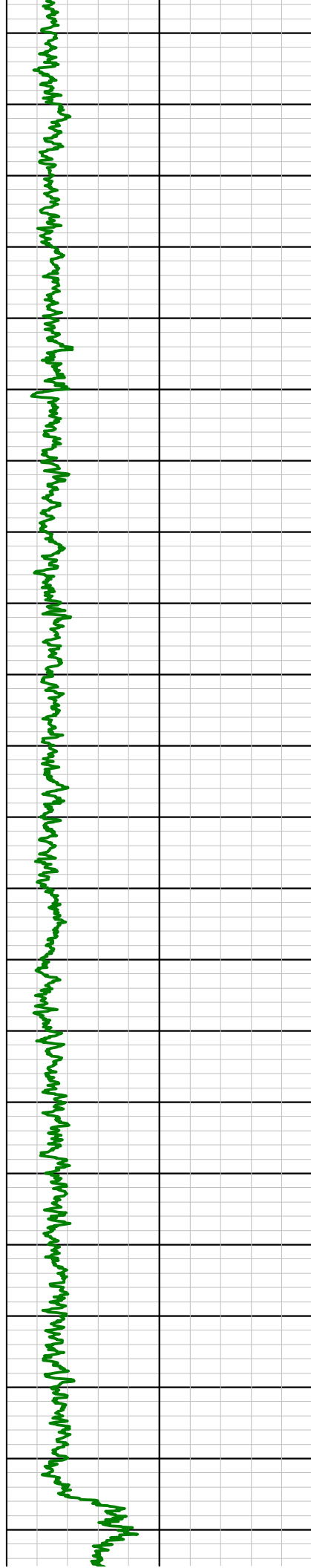
### **Q1 2020 Temperature Logs**

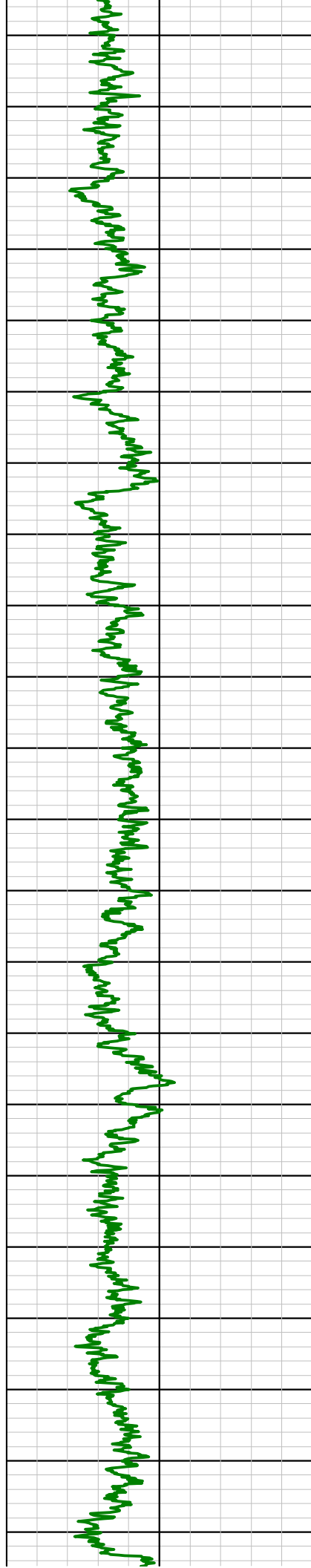
Hole Information	Depth 1 in:20ft	Temperature (9:10 AM)	
		60	Deg F 100
Well Name: WB-01 Survey Date: 03-13-20 Elevation: 1478.56 Ft Northing (NAD83): 746167.49 Easting (NAD83): 847695.07 Shut In Time: 24 Hours 0 Min Base of Lowermost USDW: 302 Ft		Temperature (1:10 PM)	
		60	Deg F 100
		Differential Temperture	
		-2	Deg F 2
Nat. Gamma			
0	API	400	

WB-01 Temperature Evaluation









400.0

420.0

440.0

460.0

480.0

500.0

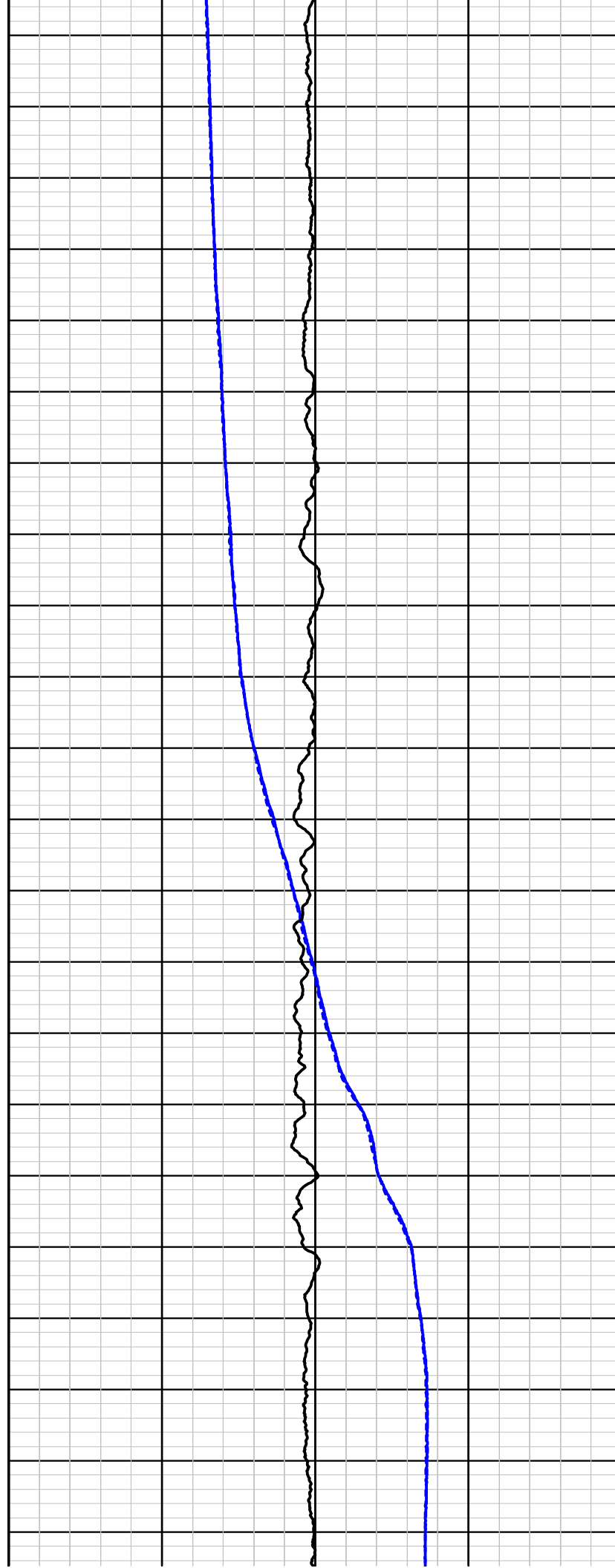
520.0

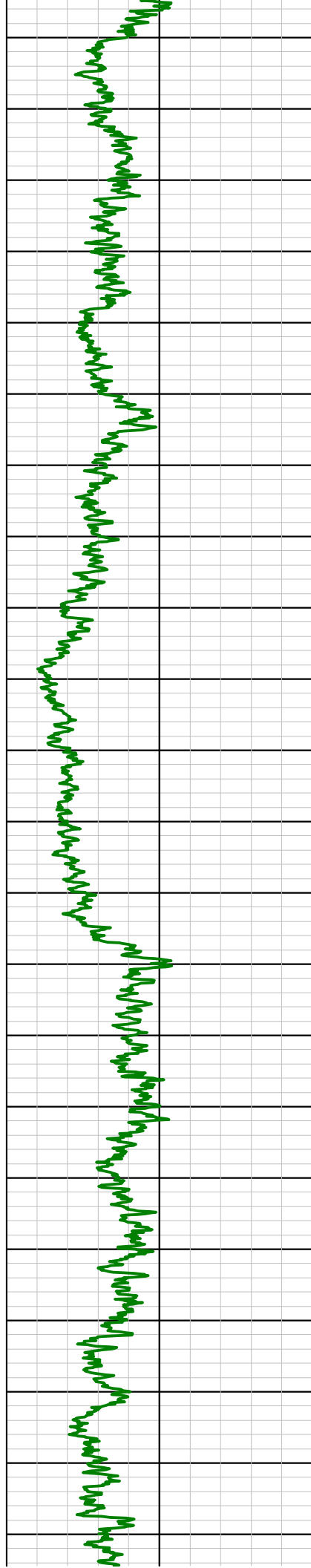
540.0

560.0

580.0

600.0





620.0

640.0

660.0

680.0

700.0

720.0

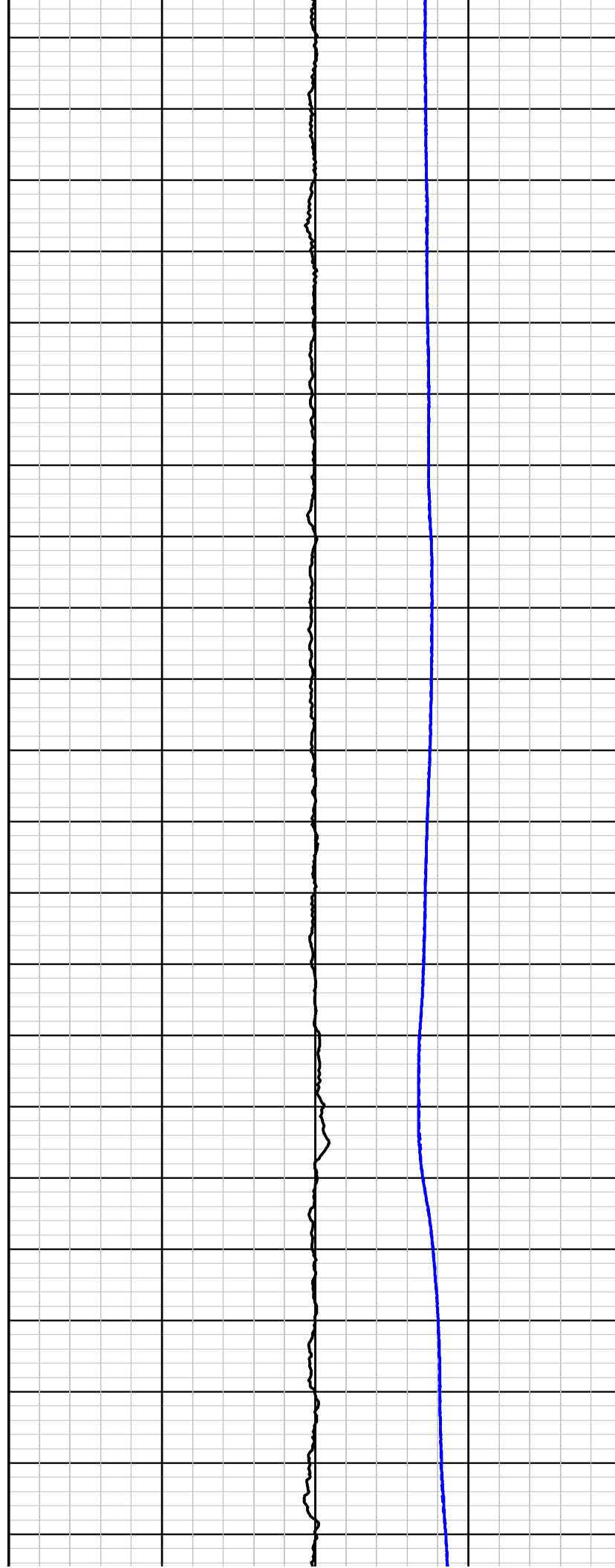
740.0

760.0

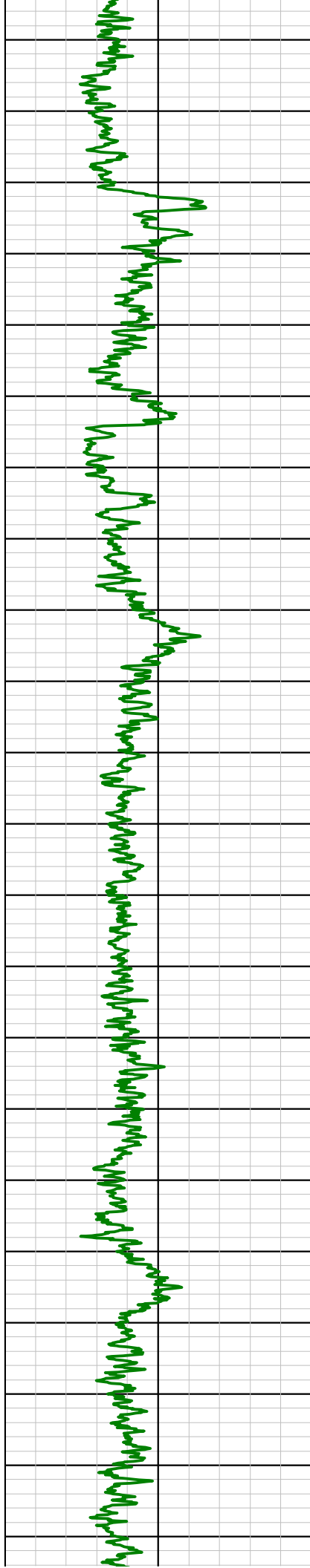
780.0

800.0

820.0







840.0

860.0

880.0

900.0

920.0

940.0

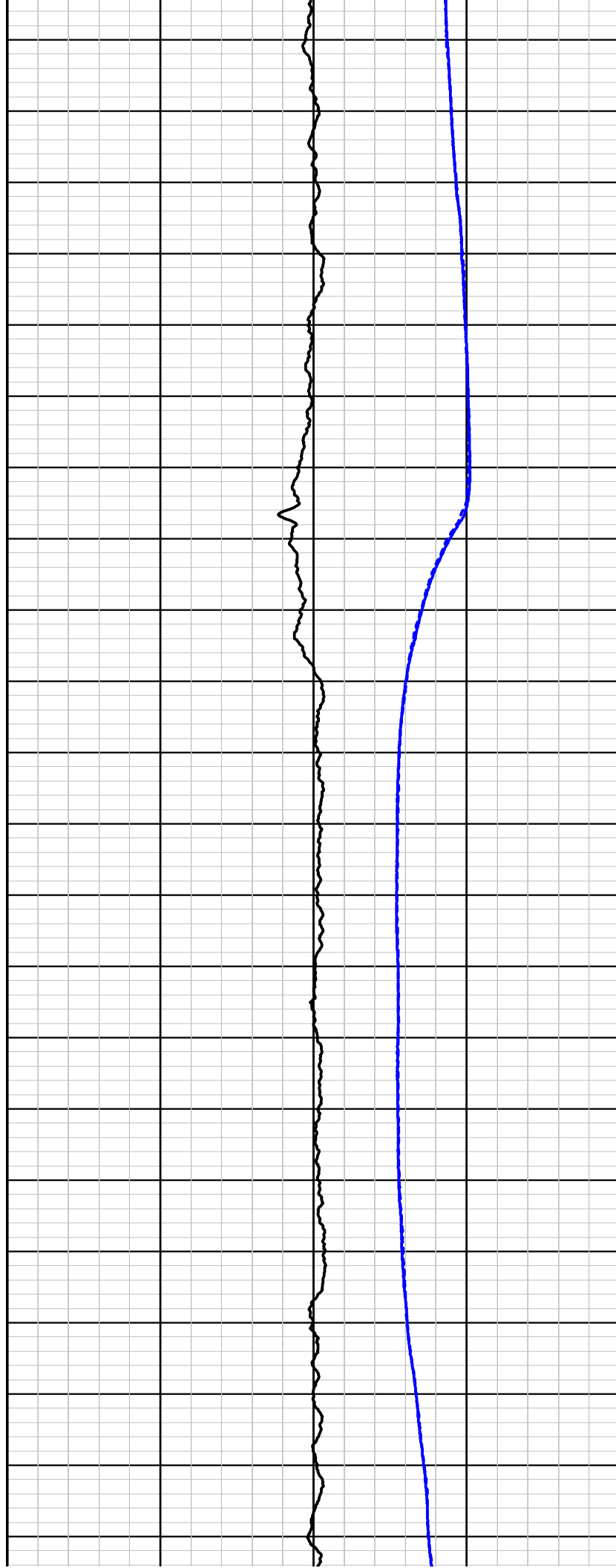
960.0

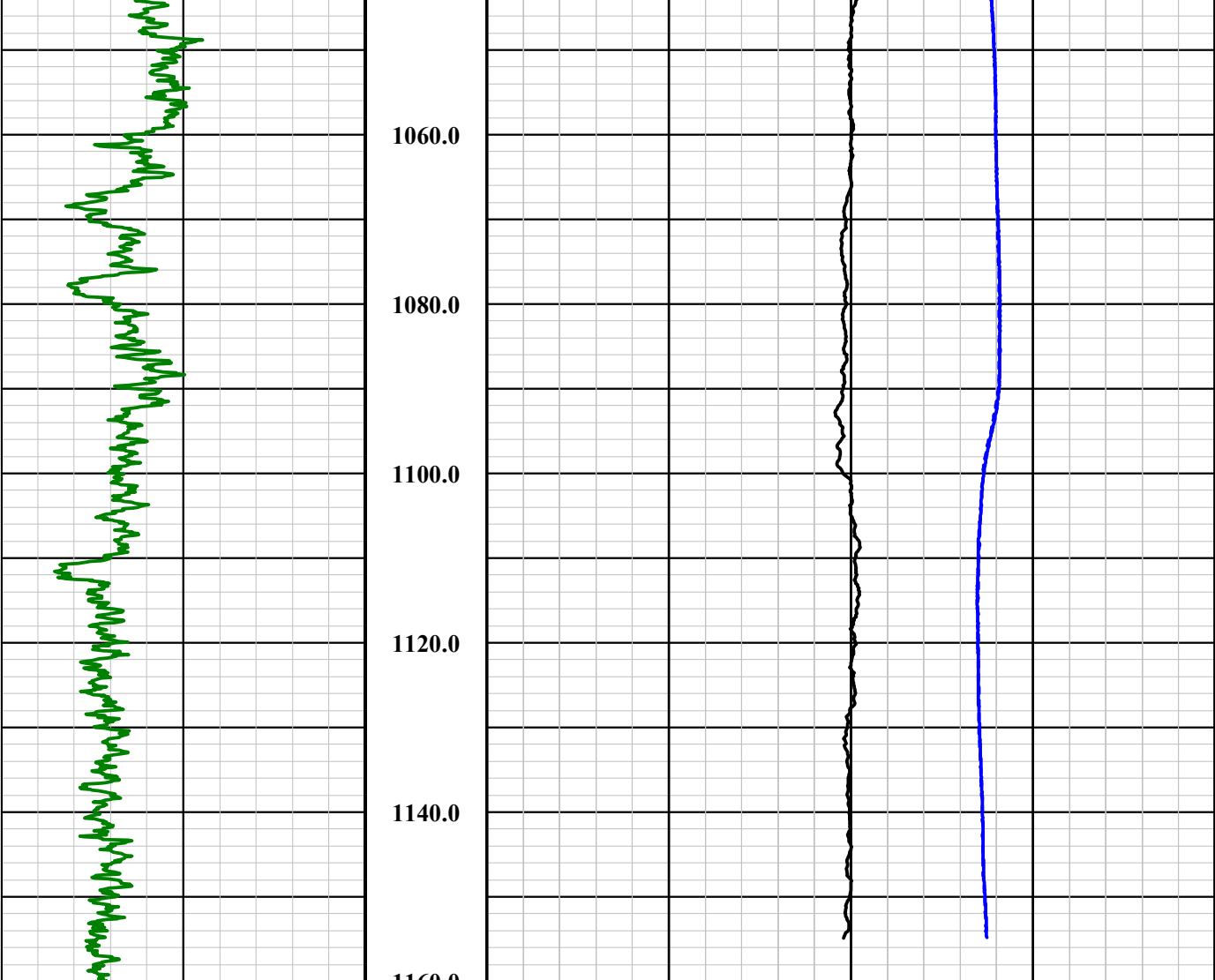
980.0

1000.0

1020.0

1040.0





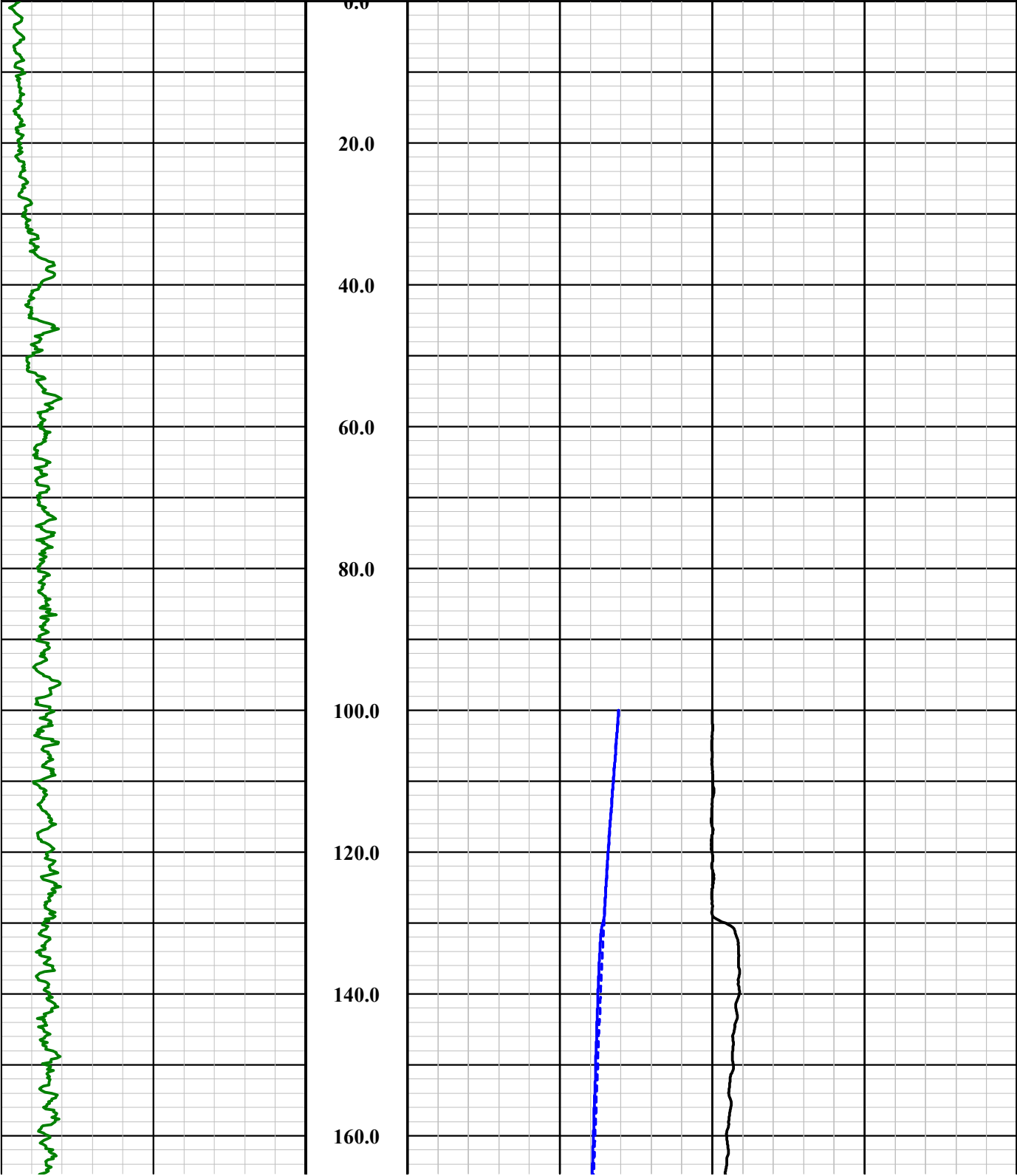
**WB-01 Temperature Evaluation**

0	API	400
<hr/>		
<b>Nat. Gamma</b>		
Base of Lowermost USDW: 302 Ft		
Shut In Time: 24 Hours 0 Min		
Easting (NAD83): 847695.07		
Northing (NAD83): 746167.49		
Elevation: 1478.56 Ft		
Survey Date: 03-13-20		
Well Name: WB-01		
<b>Hole Information</b>		

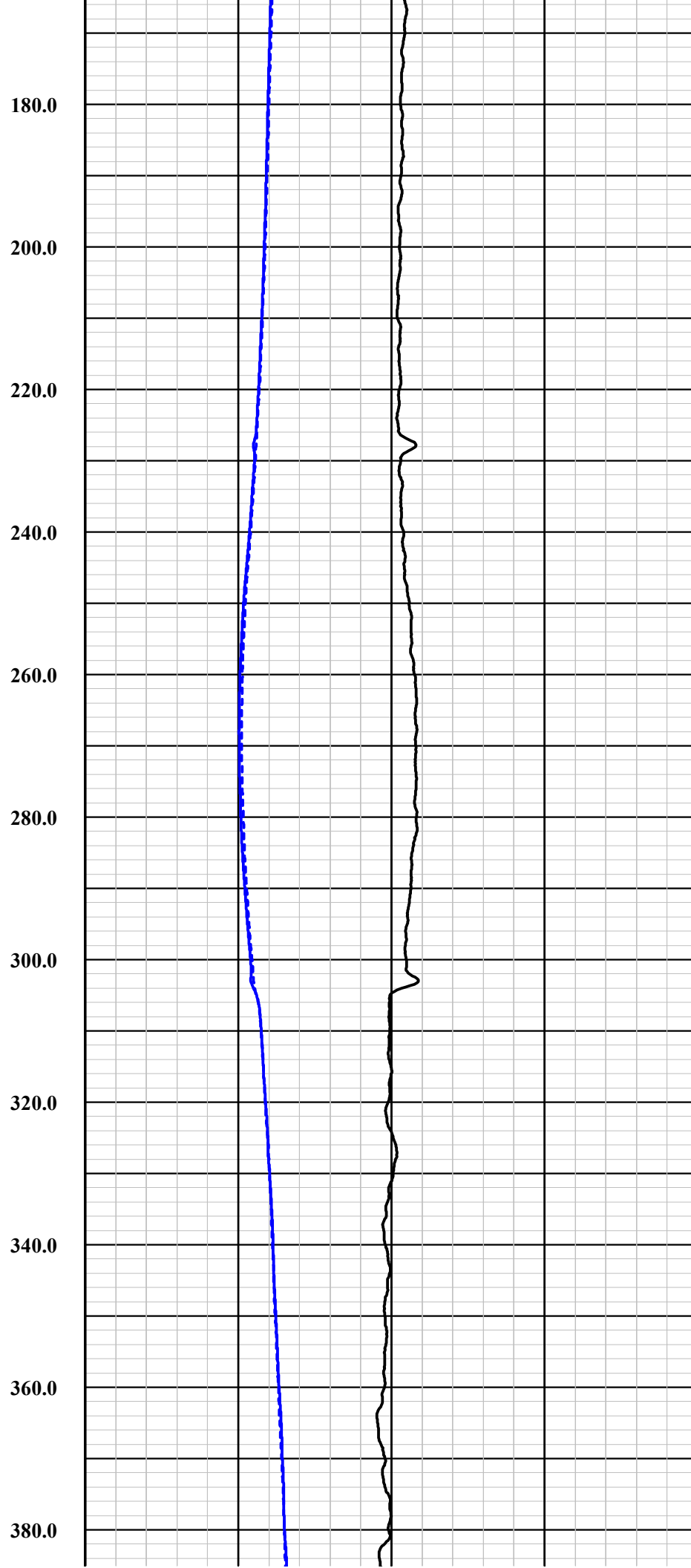
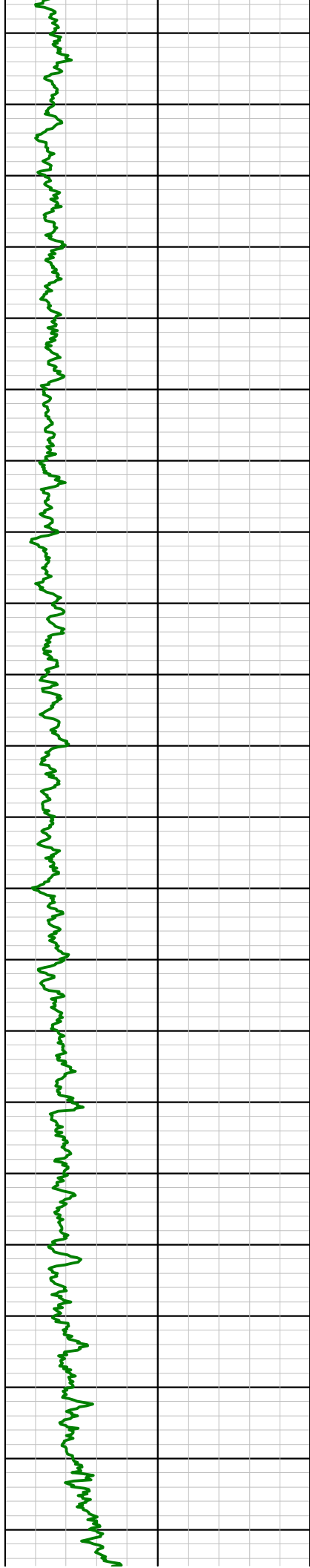
1in:20ft <b>Depth</b>	-2	Deg F	2
	<hr/>		
	<b>Differential Temperture</b>		
	60	Deg F	100
	<hr style="border-top: 1px dashed blue;"/>		
	<b>Temperature (1:10 PM)</b>		
	60	Deg F	100
	<hr style="border-top: 1px solid blue;"/>		
	<b>Temperature (9:10 AM)</b>		

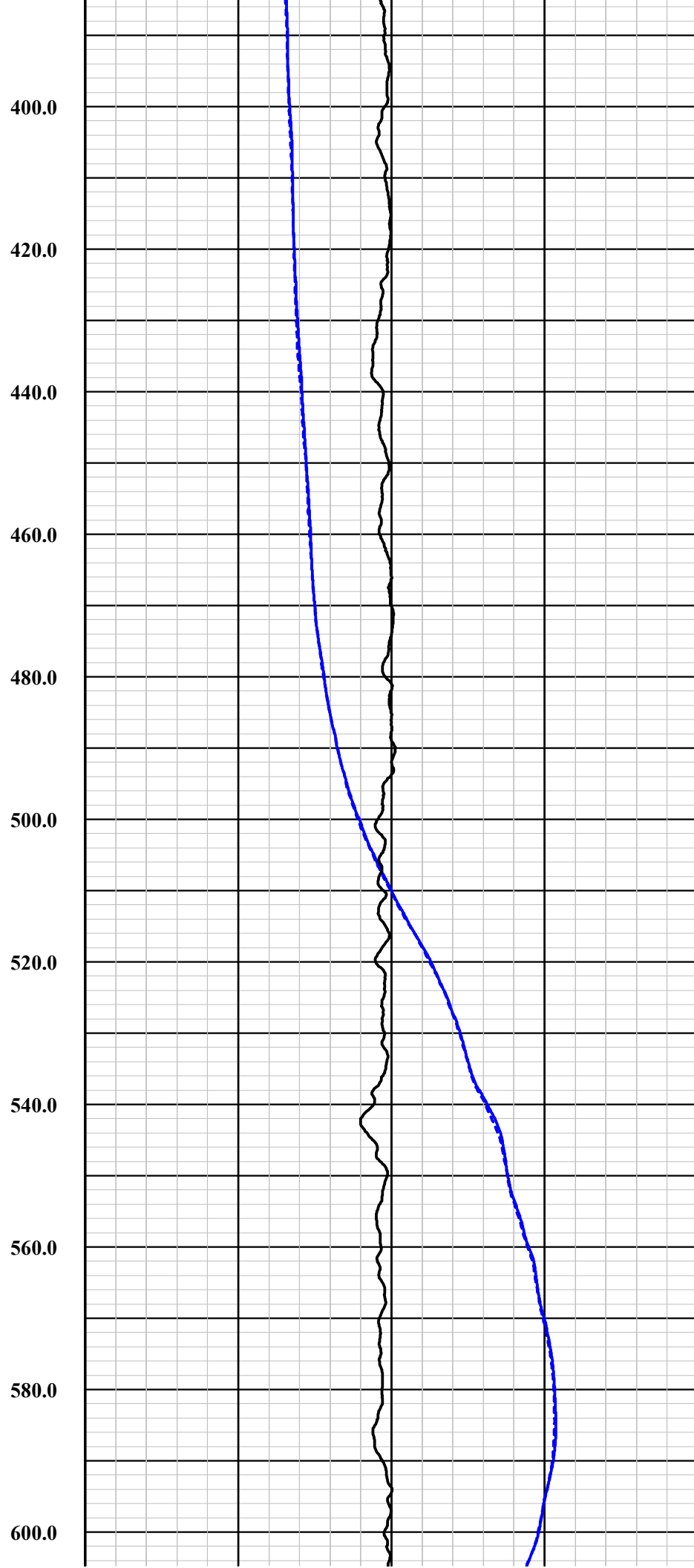
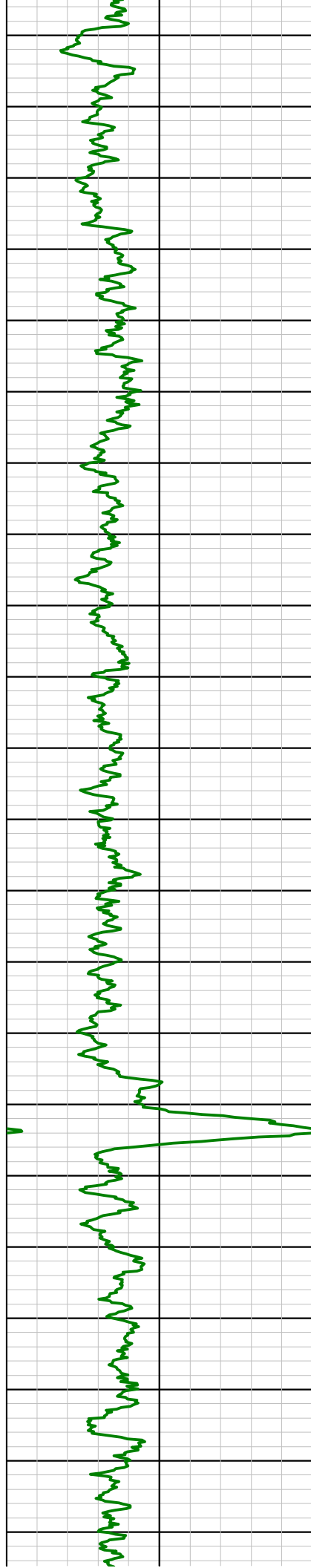
Hole Information		Depth	Temperature (10:00 AM)	
		1 in:20ft	60	100
Well Name: WB-02			Temperature (2:00 PM)	
Survey Date: 03-13-20			60	100
Elevation: 1478.27 Ft			Differential Temperture	
Northing (NAD83): 746131.32			-2	2
Easting (NAD83): 847730.23				
Shut In Time: 24 Hours 0 Min				
Base of Lowermost USDW: 300 Ft				
Nat. Gamma				
0	API	400		

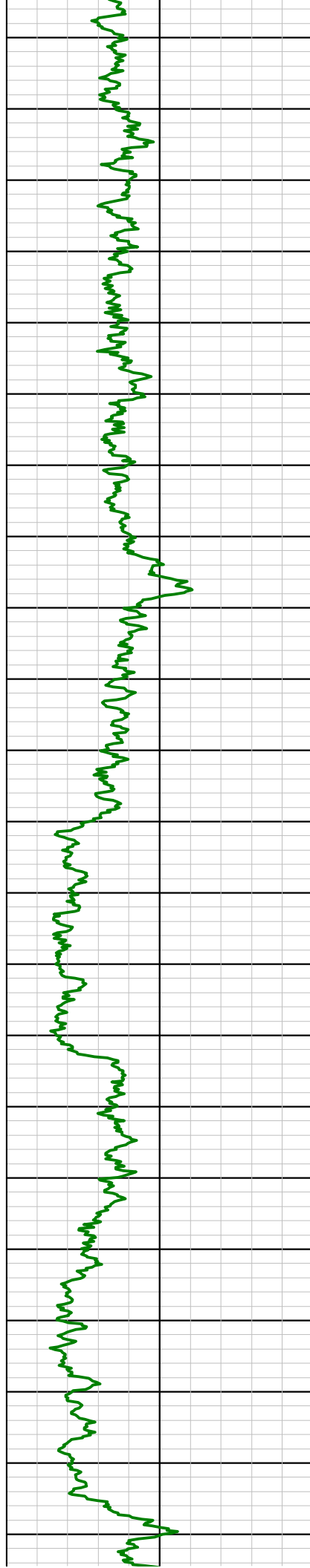
WB-02 Temperature Evaluation











620.0

640.0

660.0

680.0

700.0

720.0

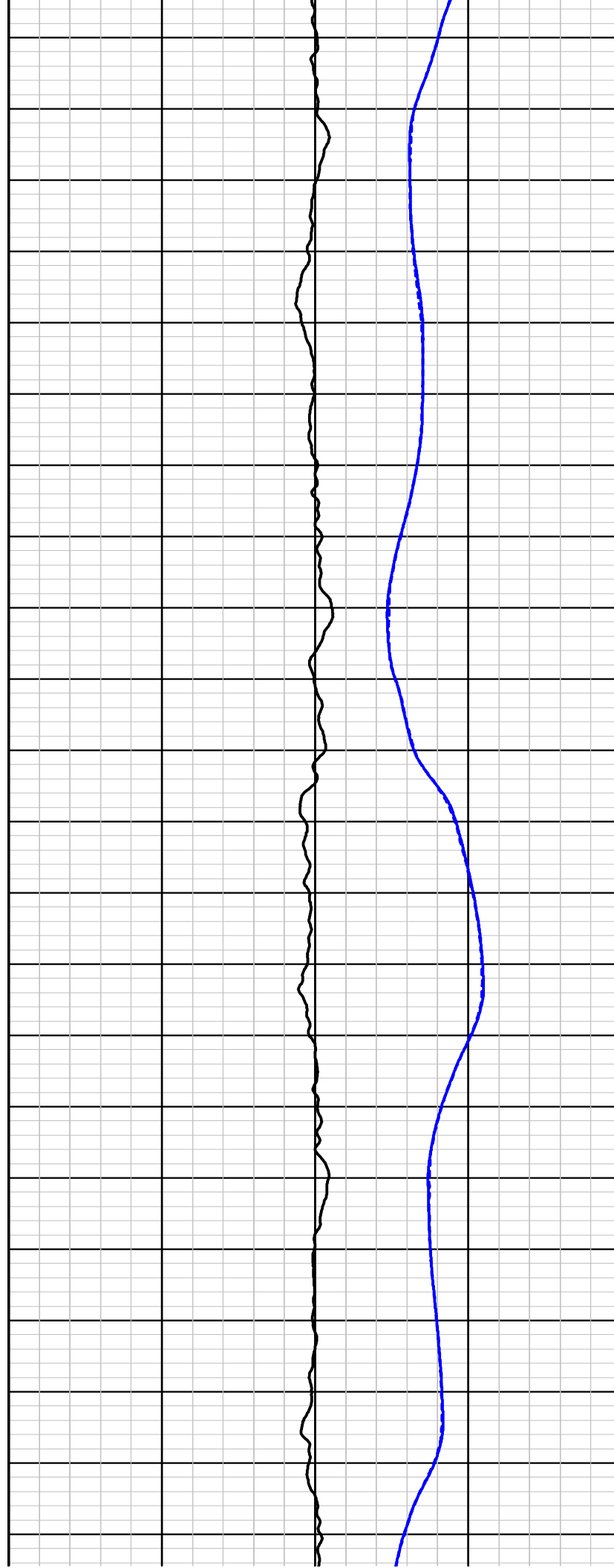
740.0

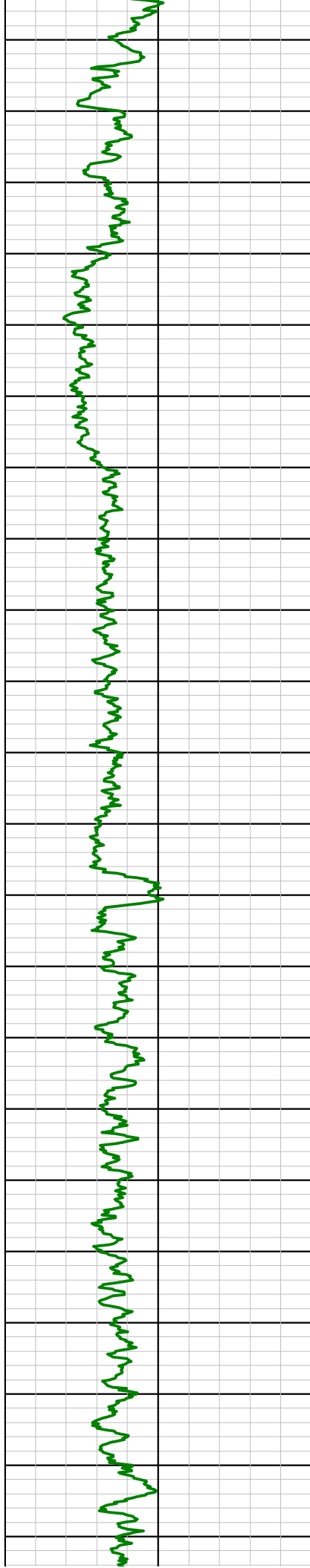
760.0

780.0

800.0

820.0





840.0

860.0

880.0

900.0

920.0

940.0

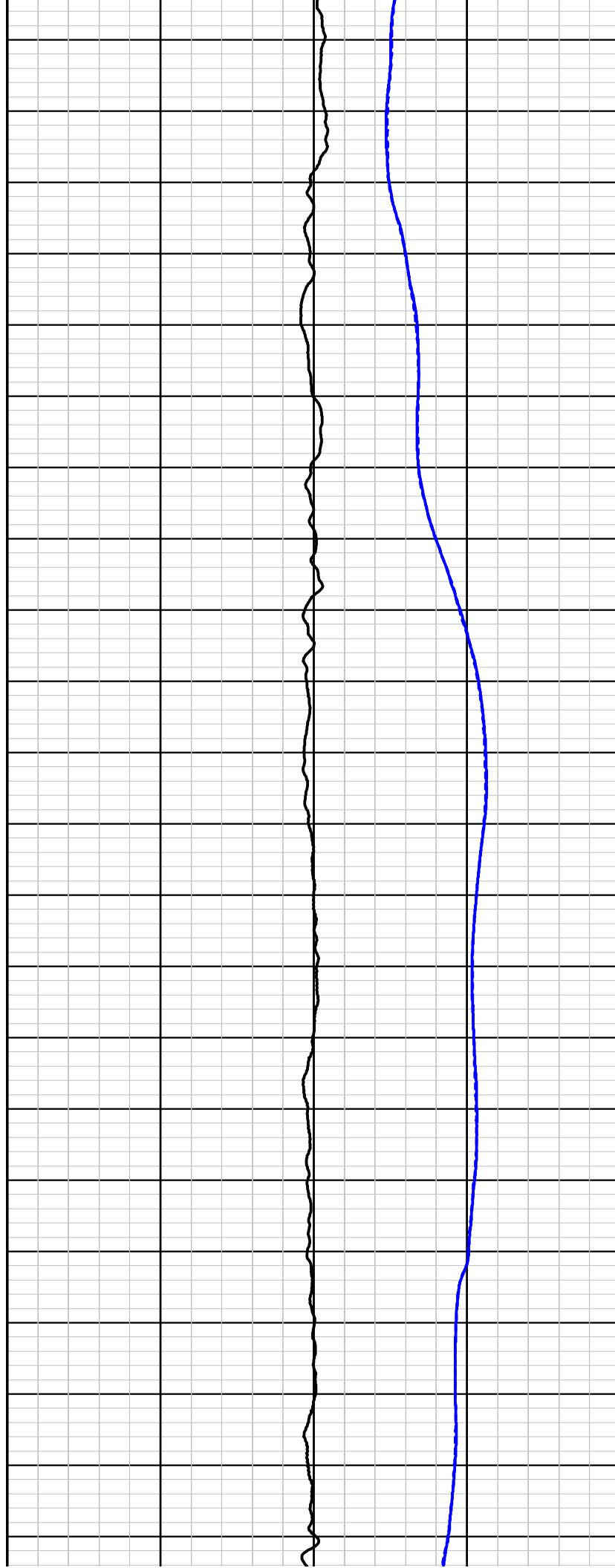
960.0

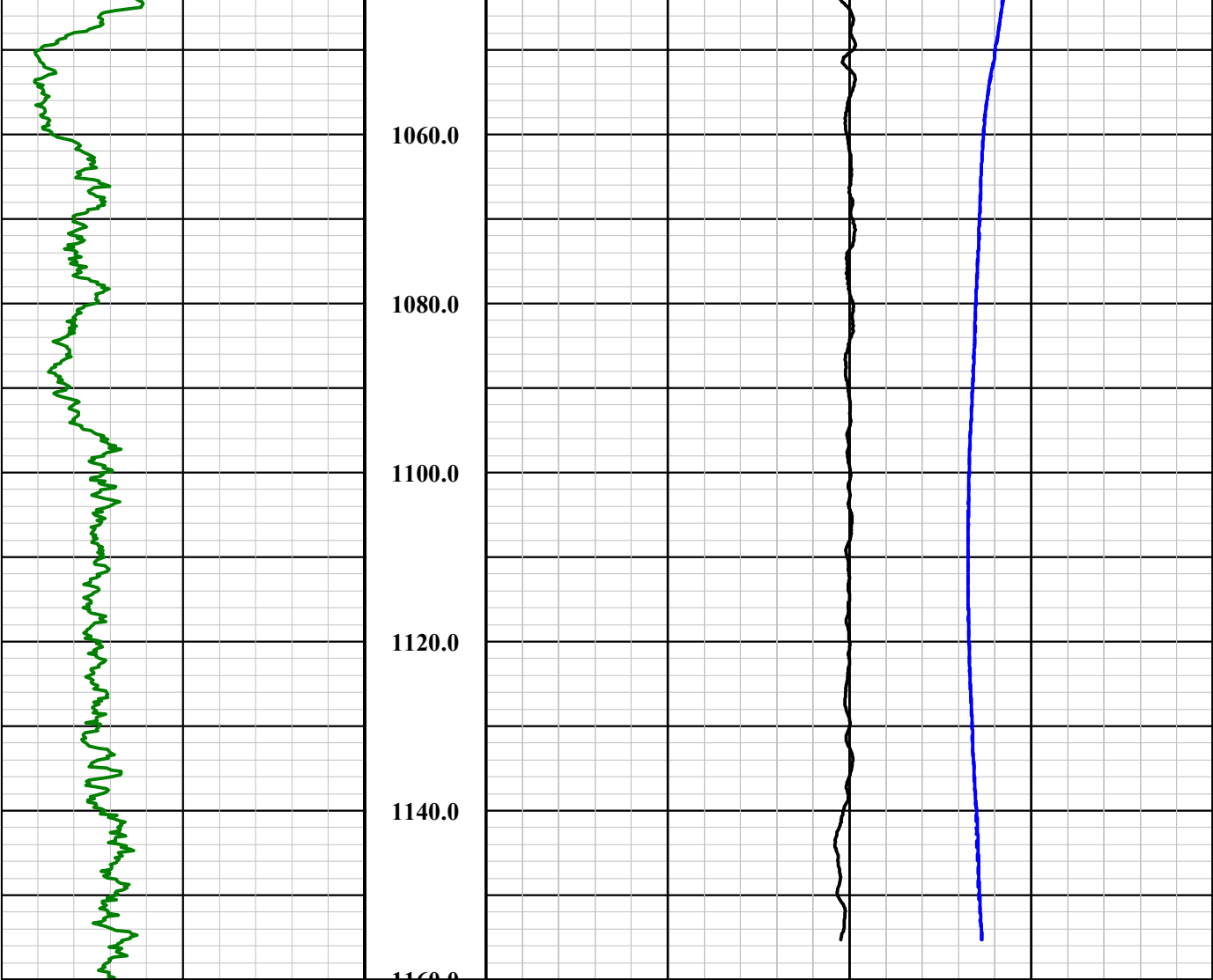
980.0

1000.0

1020.0

1040.0





**WB-02 Temperature Evaluation**

0                      API                      400

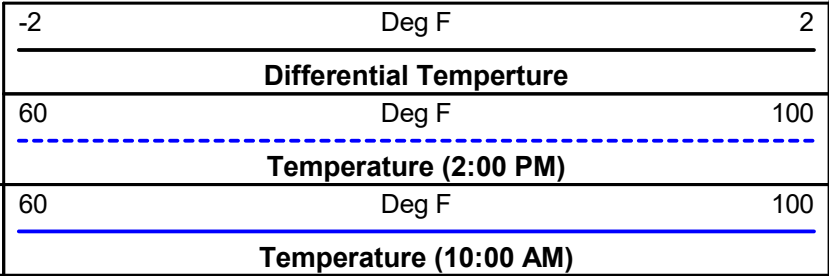
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**Nat. Gamma**

Base of Lowermost USDW: 300 Ft  
Shut In Time: 24 Hours 0 Min  
Easting (NAD83): 847730.23  
Northing (NAD83): 746131.32  
Elevation: 1478.27 Ft  
Survey Date: 03-13-20  
Well Name: WB-02

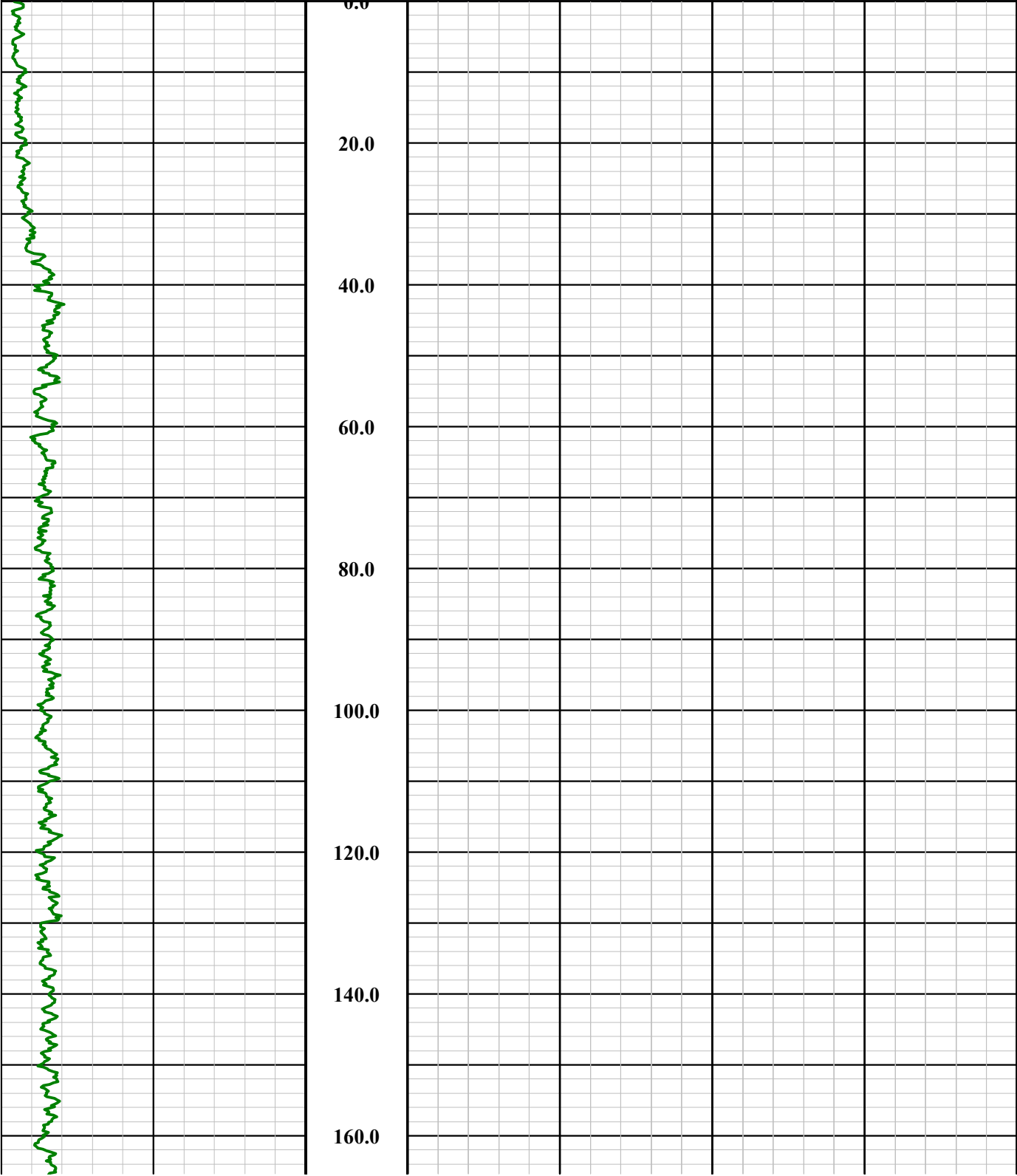
**Hole Information**

1in:20ft  
**Depth**

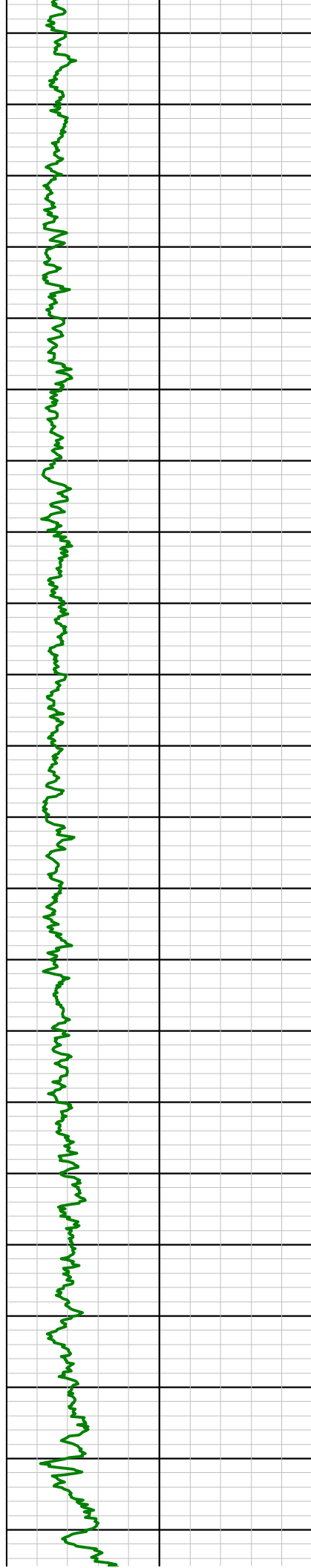


Hole Information	Depth	Temperature (7:10 AM)		
	1 in:20ft	60	Deg F	100
Well Name: WB-03		Temperature (11:10 AM)		
Survey Date: 03-13-20		60	Deg F	100
Elevation: 1478.18 Ft		Differential Temperature		
Northing (NAD83): 746096.49		-2	Deg F	2
Easting (NAD83): 847694.07				
Shut In Time: 24 Hours 0 Min				
Base of Lowermost USDW: 300 Ft				
Nat. Gamma				
0	API	400		

WB-03 Temperature Evaluation







180.0

200.0

220.0

240.0

260.0

280.0

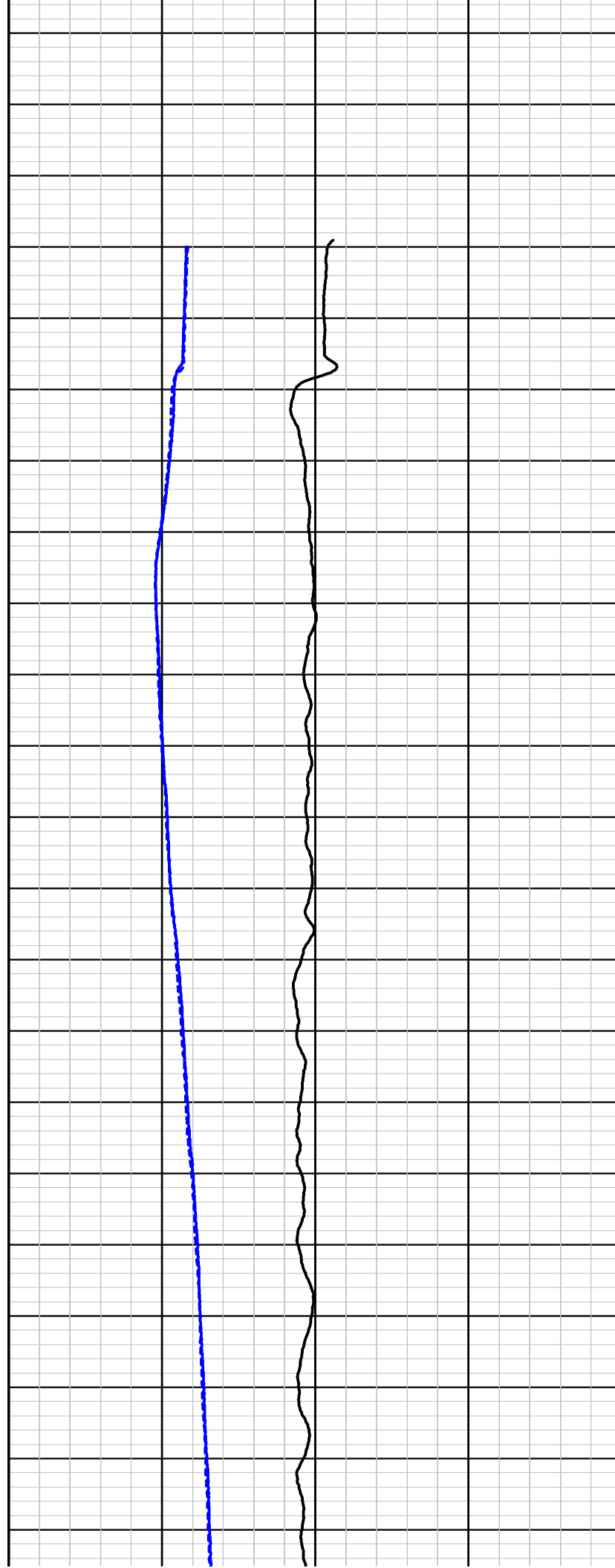
300.0

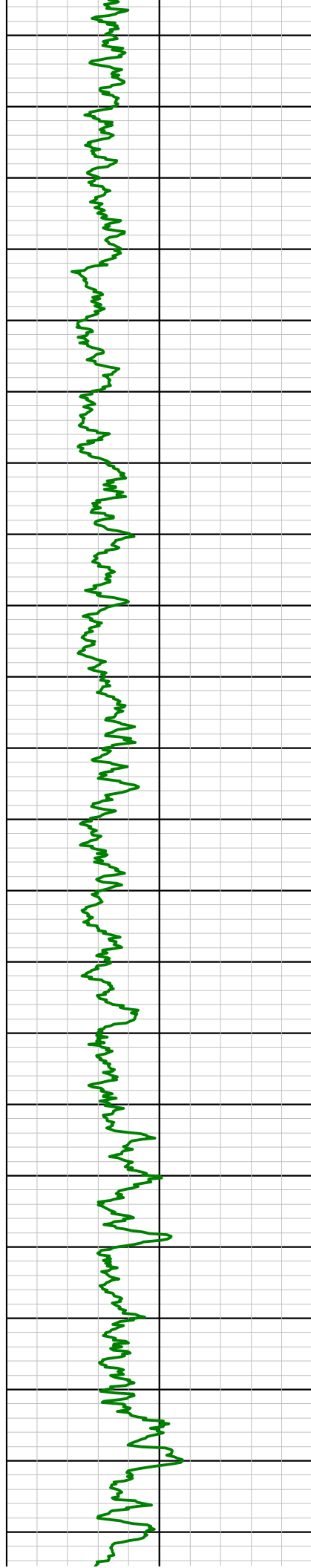
320.0

340.0

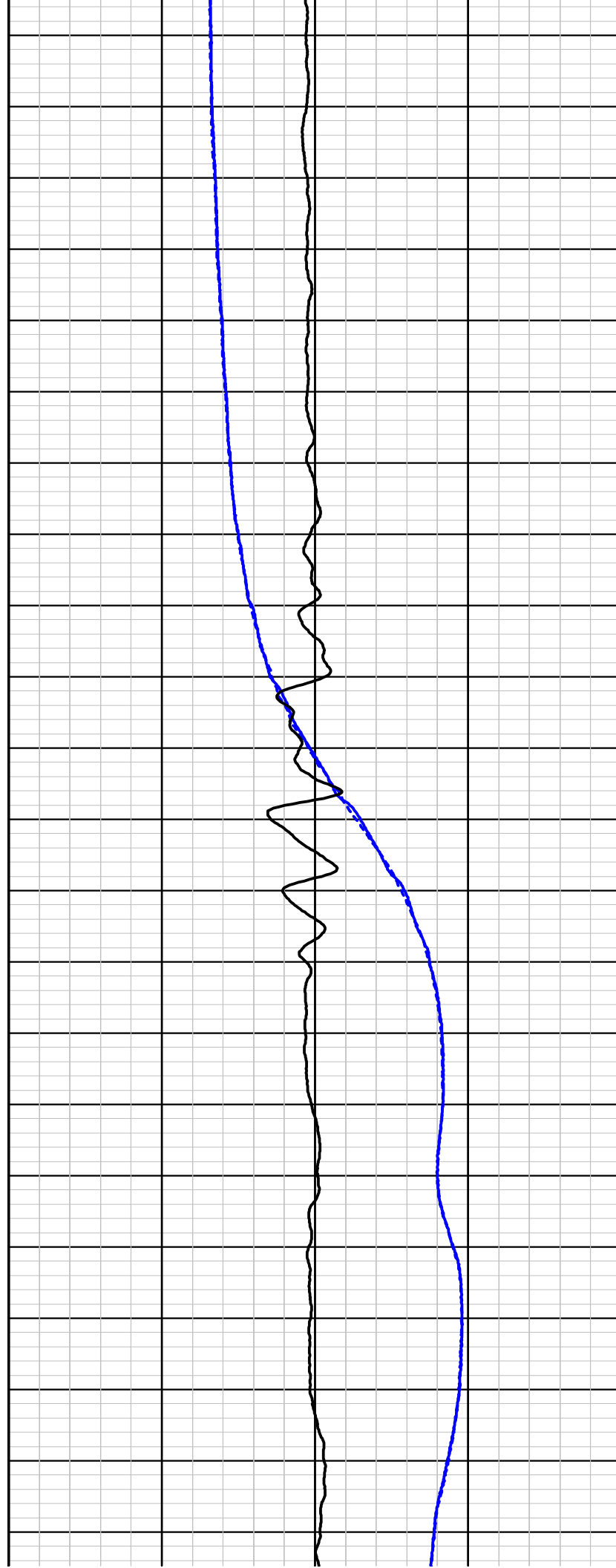
360.0

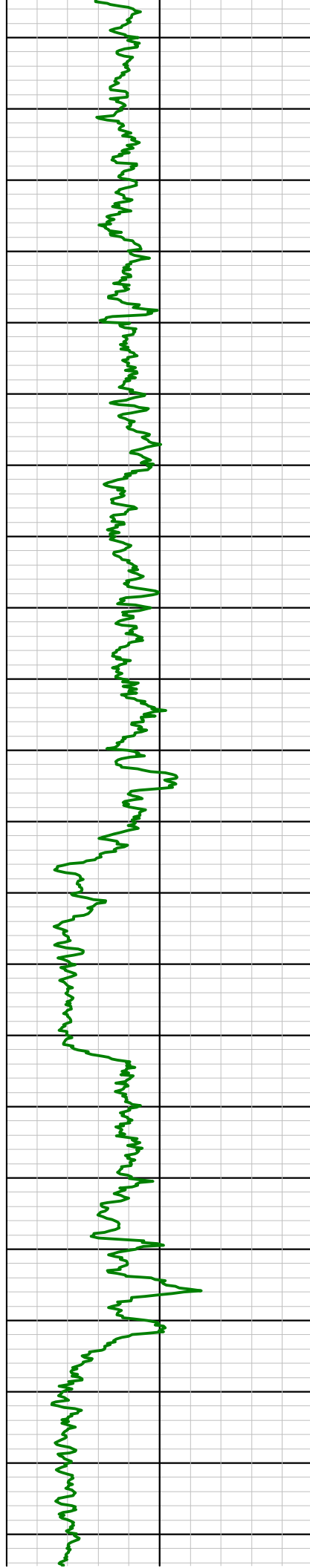
380.0





400.0  
420.0  
440.0  
460.0  
480.0  
500.0  
520.0  
540.0  
560.0  
580.0  
600.0





620.0

640.0

660.0

680.0

700.0

720.0

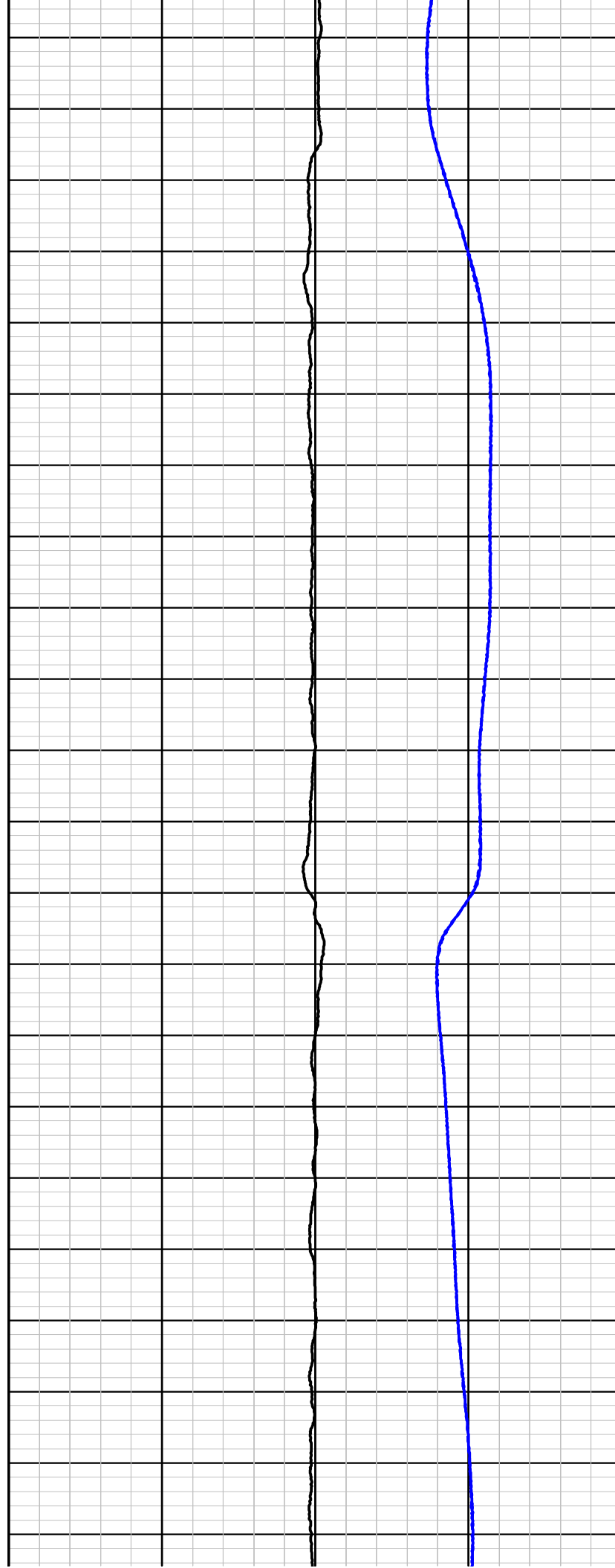
740.0

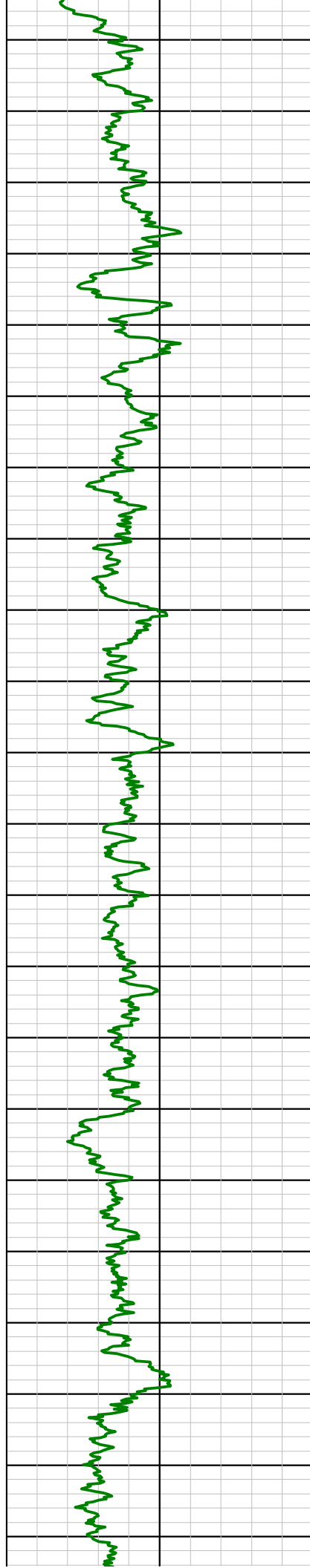
760.0

780.0

800.0

820.0





840.0

860.0

880.0

900.0

920.0

940.0

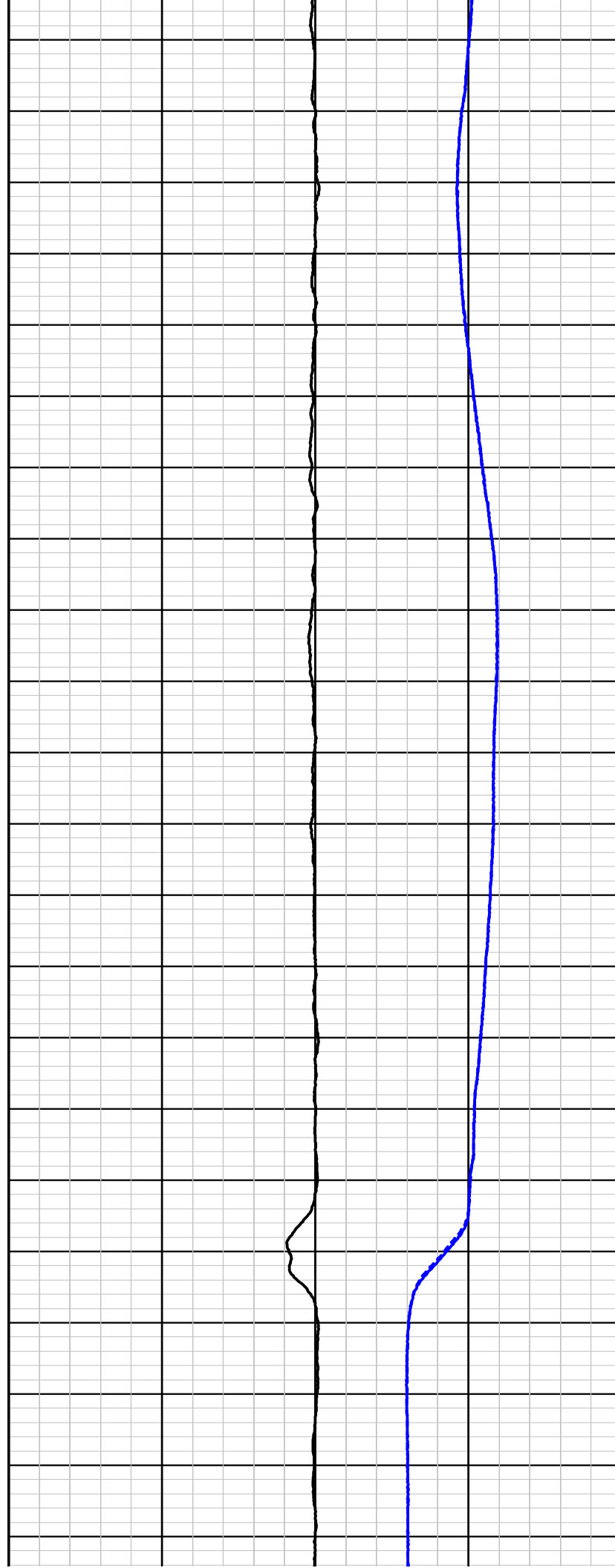
960.0

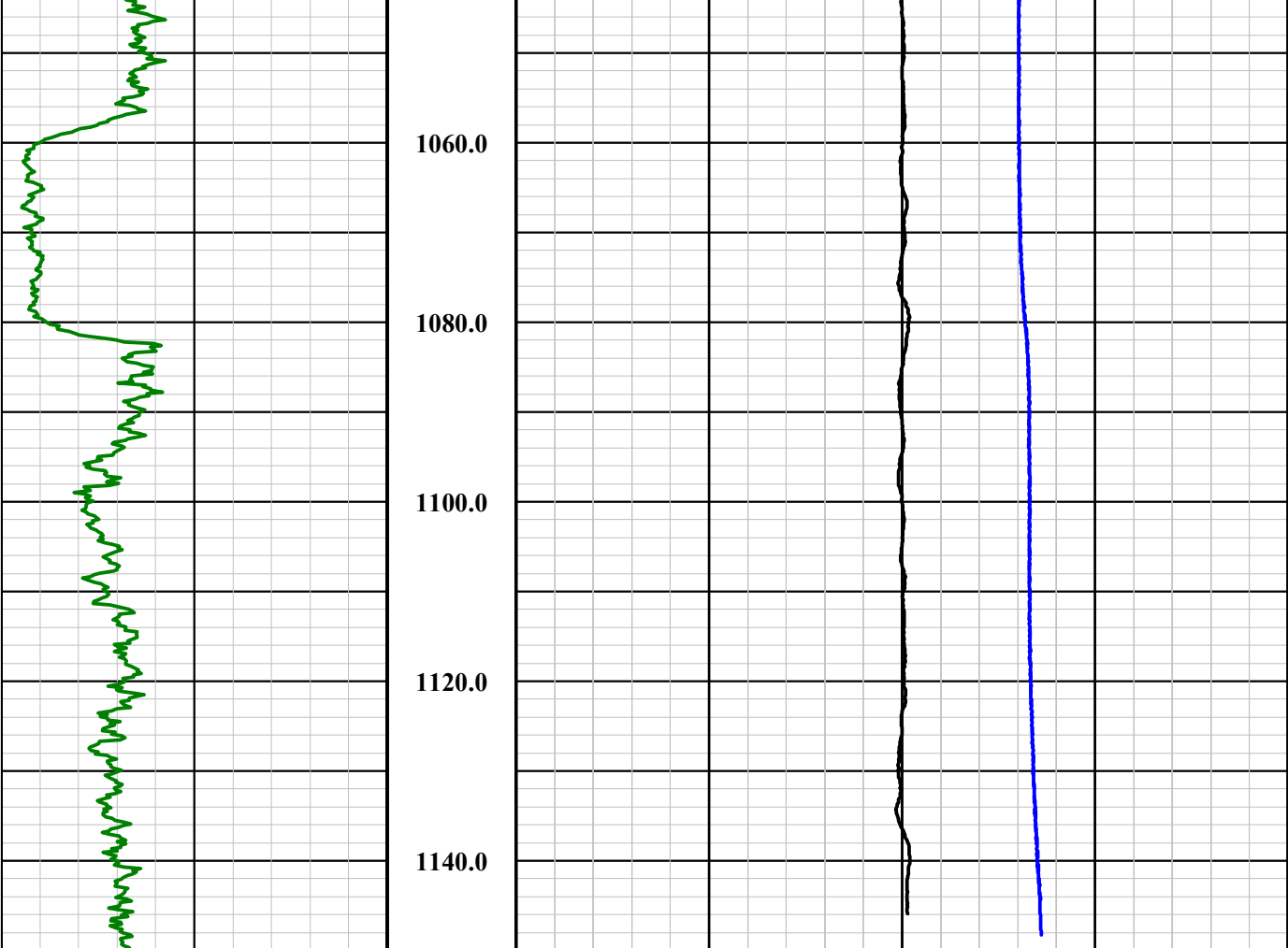
980.0

1000.0

1020.0

1040.0



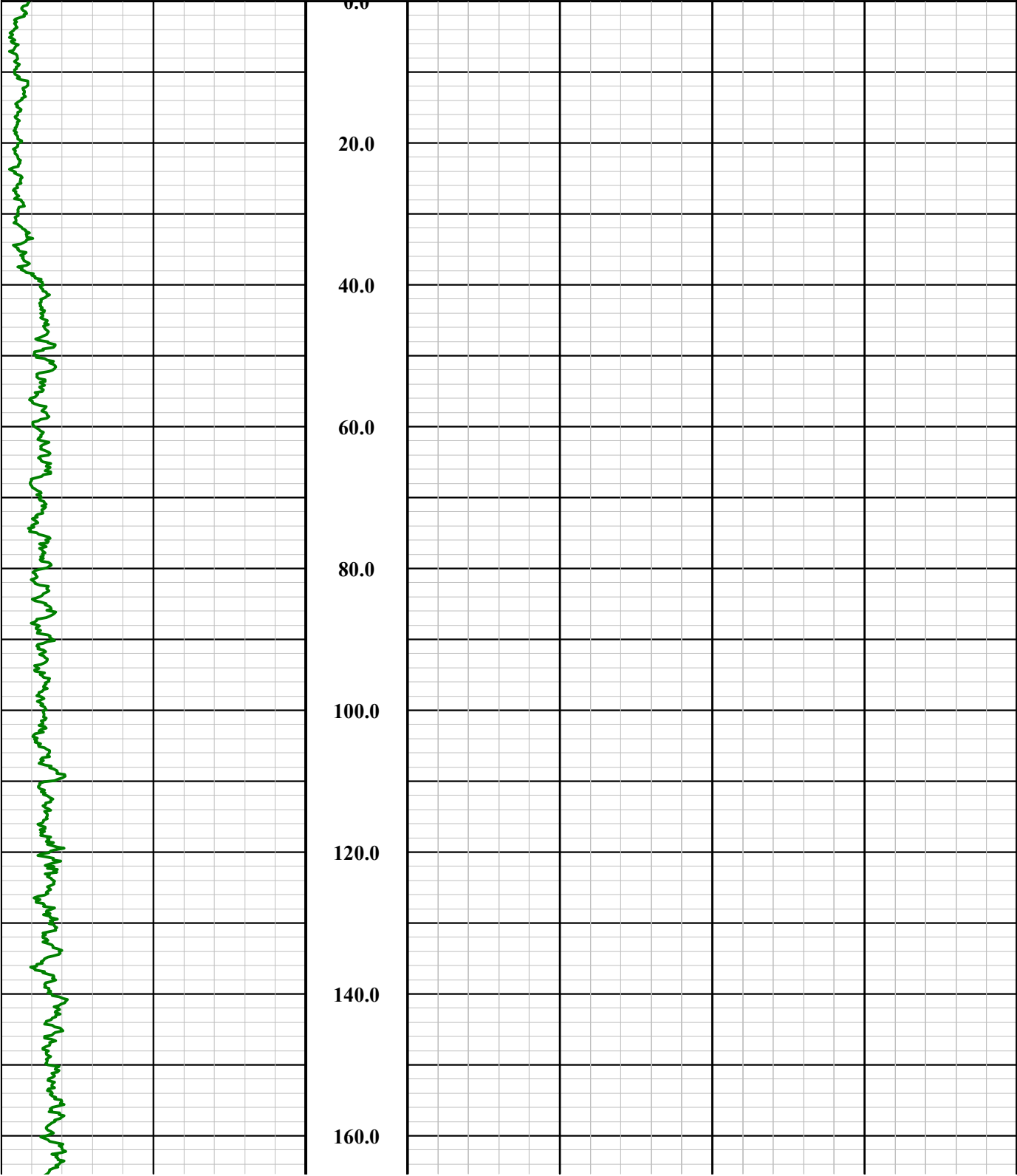


**WB-03 Temperature Evaluation**

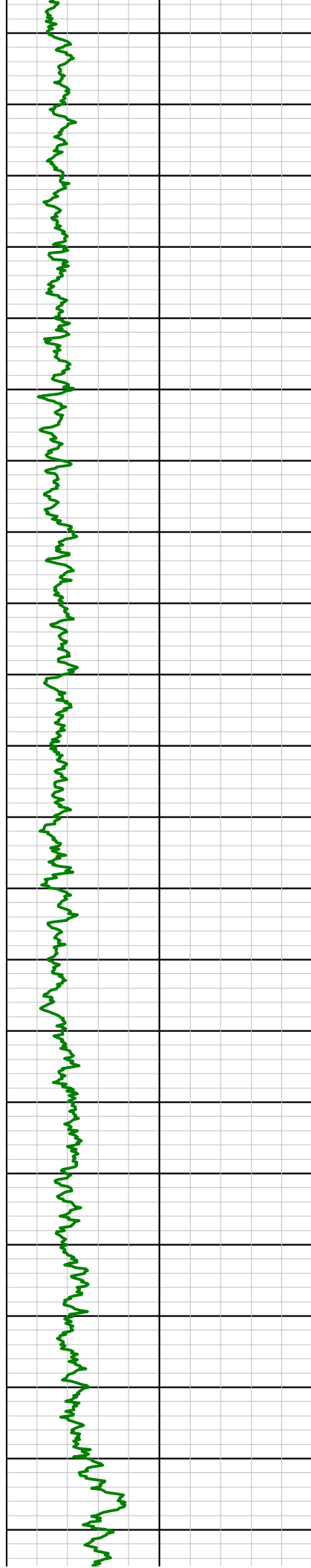
0                      API                      400			
Nat. Gamma			
Base of Lowermost USDW: 300 Ft			
Shut In Time: 24 Hours 0 Min			
Easting (NAD83): 847694.07			
Northing (NAD83): 746096.49			
Elevation: 1478.18 Ft			
Survey Date: 03-13-20			
Well Name: WB-03			
Hole Information	1in:20ft Depth	-2                      Deg F                      2	
		Differential Temperature	
		60                      Deg F                      100	
		Temperature (11:10 AM)	
		60                      Deg F                      100	
		Temperature (7:10 AM)	

Hole Information		Depth	Temperature (8:10 AM)		
		1 in:20ft	60	Deg F	100
Well Name: WB-04			Temperature (12:10 PM)		
Survey Date: 03-13-20					
Elevation: 1478.17 Ft			60	Deg F	100
Northing (NAD83): 746131.41			Differential Temperature		
Easting (NAD83): 847659.81					
Shut In Time: 24 Hours 0 Min					
Base of Lowermost USDW: 300 Ft					
Nat. Gamma					
0 API 400					

WB-04 Temperature Evaluation







180.0

200.0

220.0

240.0

260.0

280.0

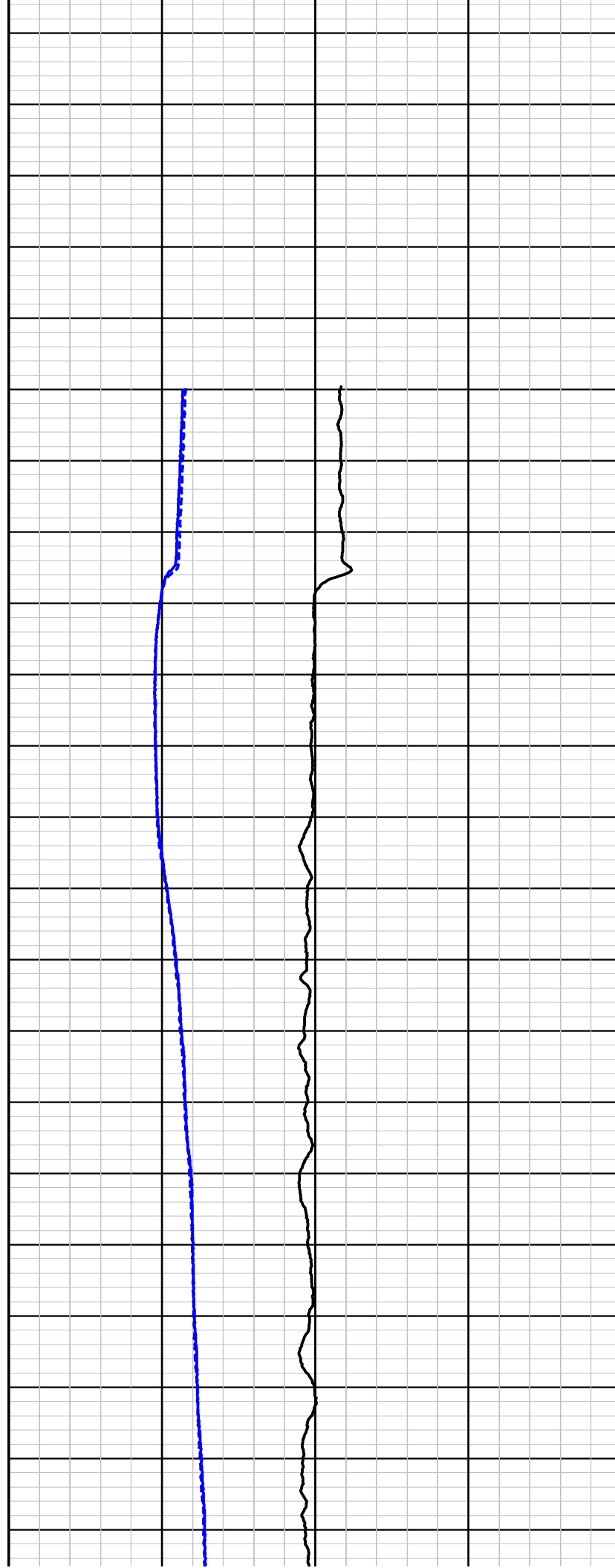
300.0

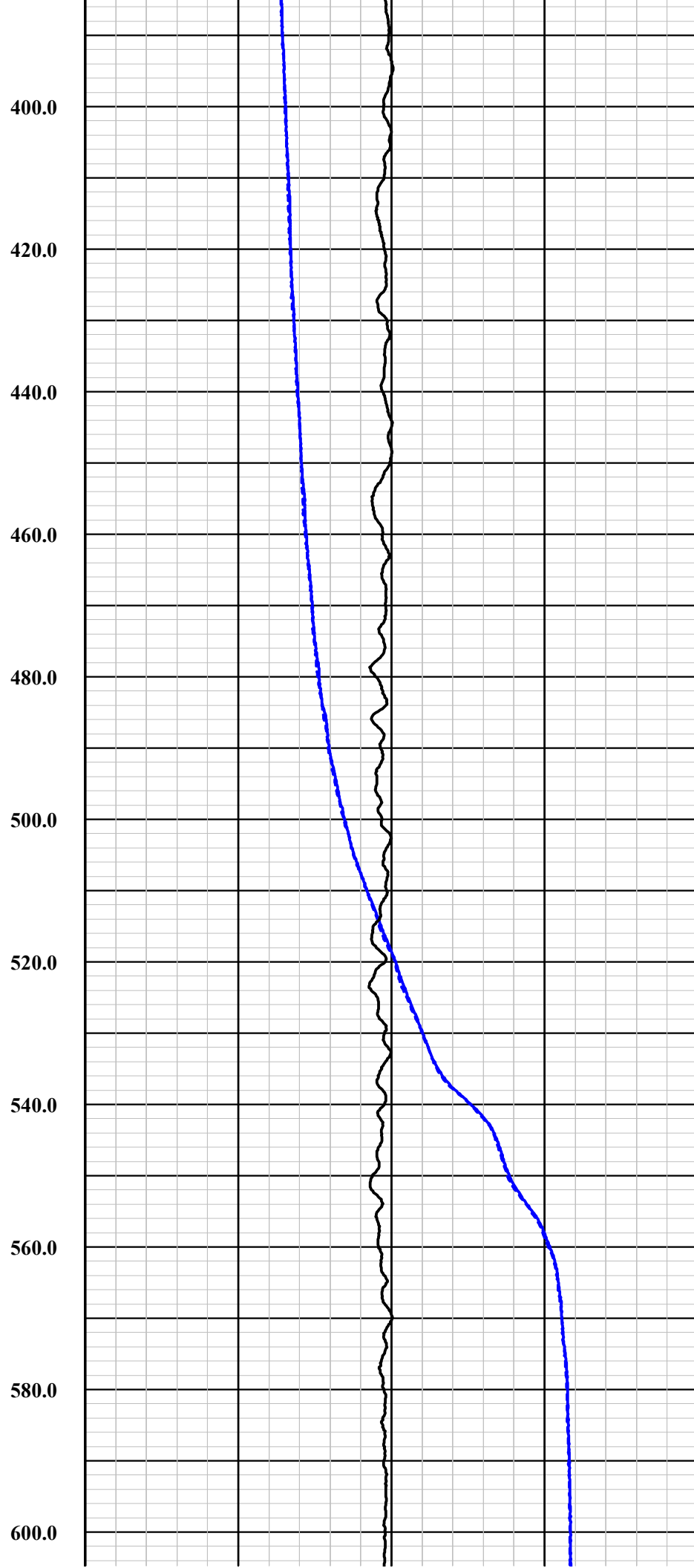
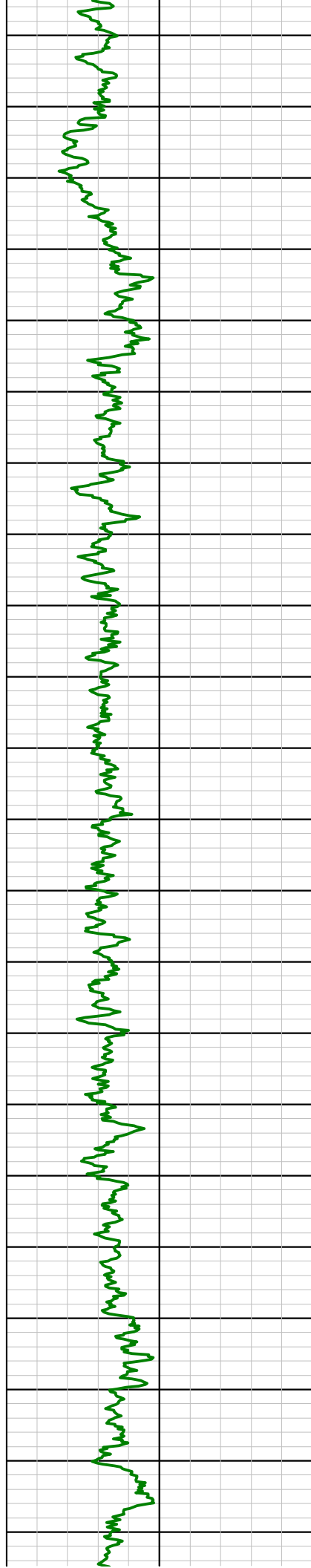
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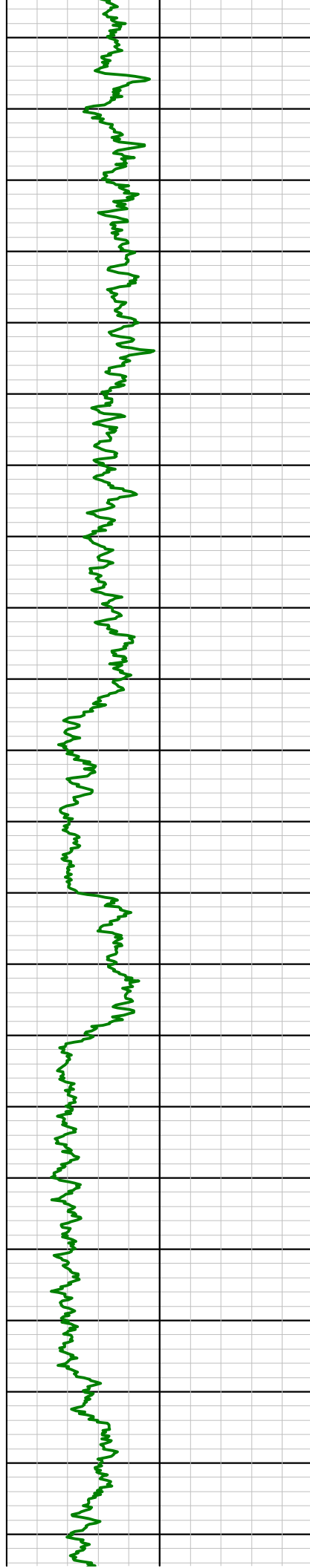
340.0

360.0

380.0







620.0

640.0

660.0

680.0

700.0

720.0

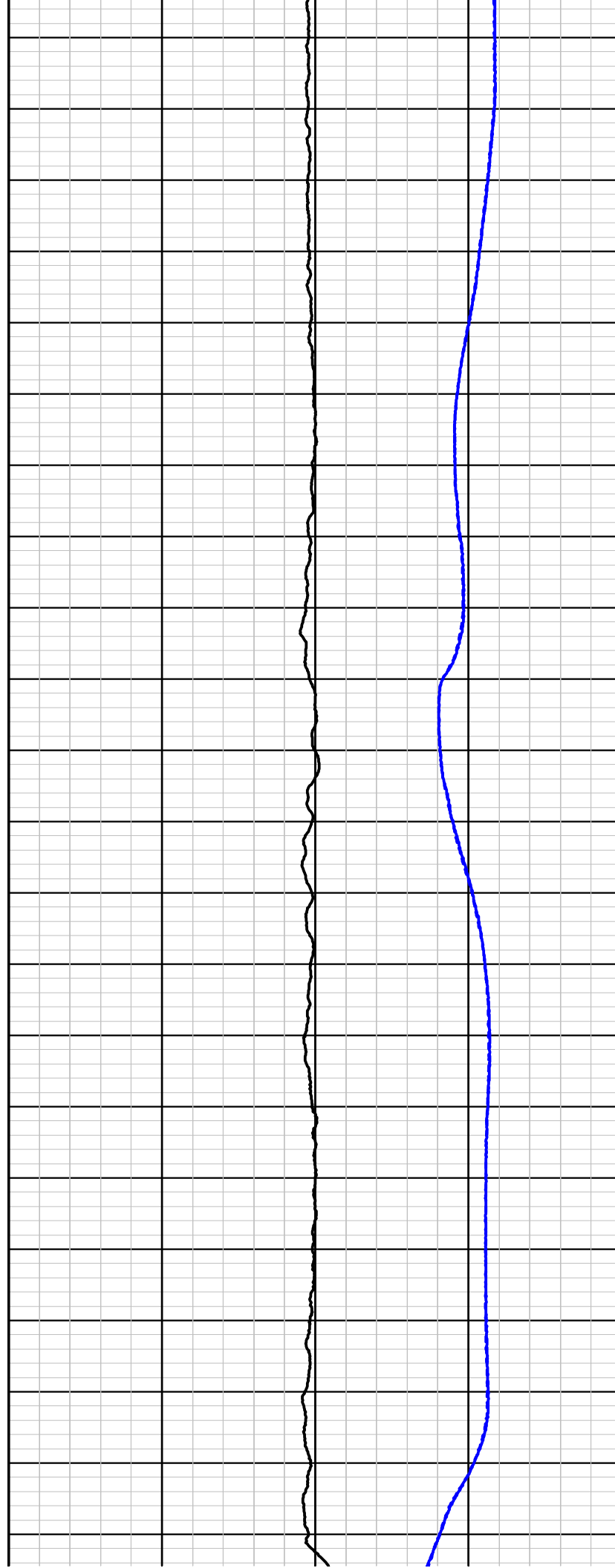
740.0

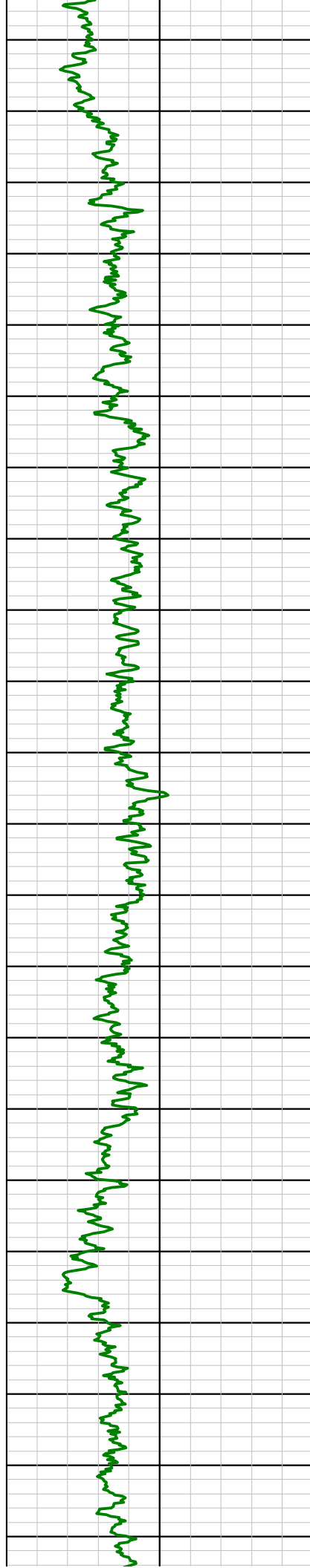
760.0

780.0

800.0

820.0





840.0

860.0

880.0

900.0

920.0

940.0

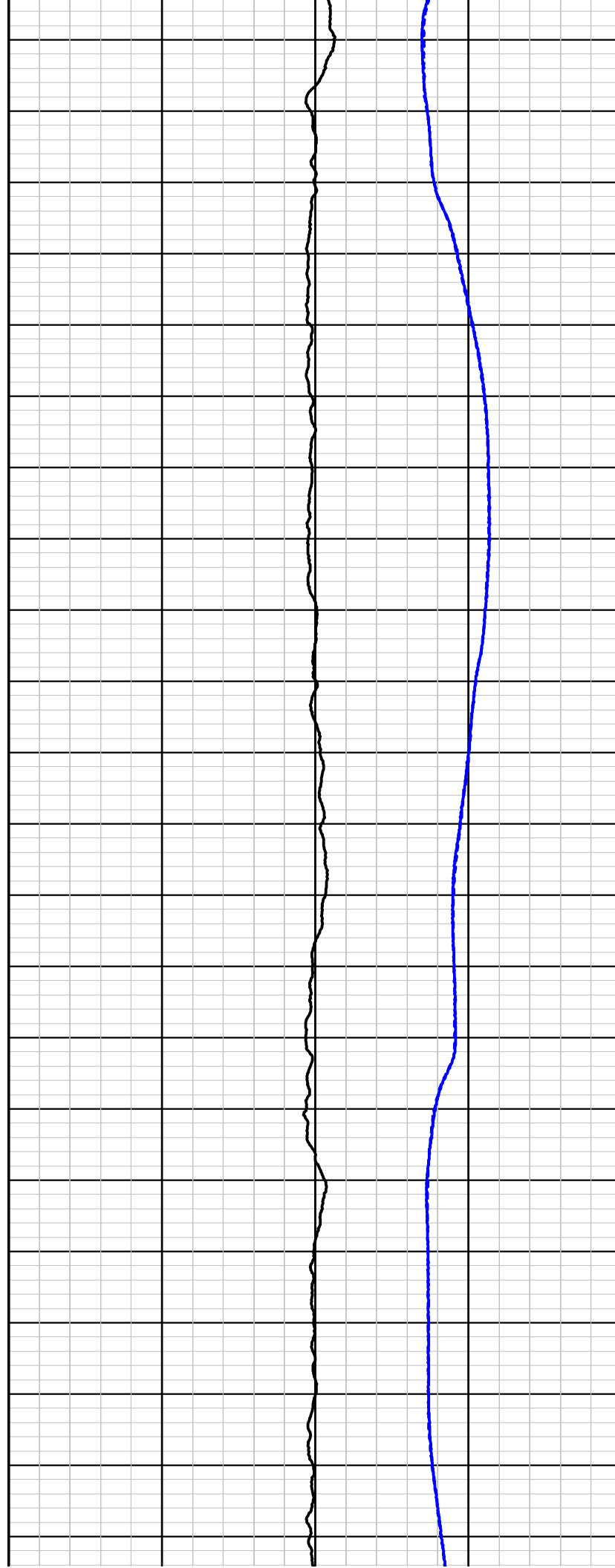
960.0

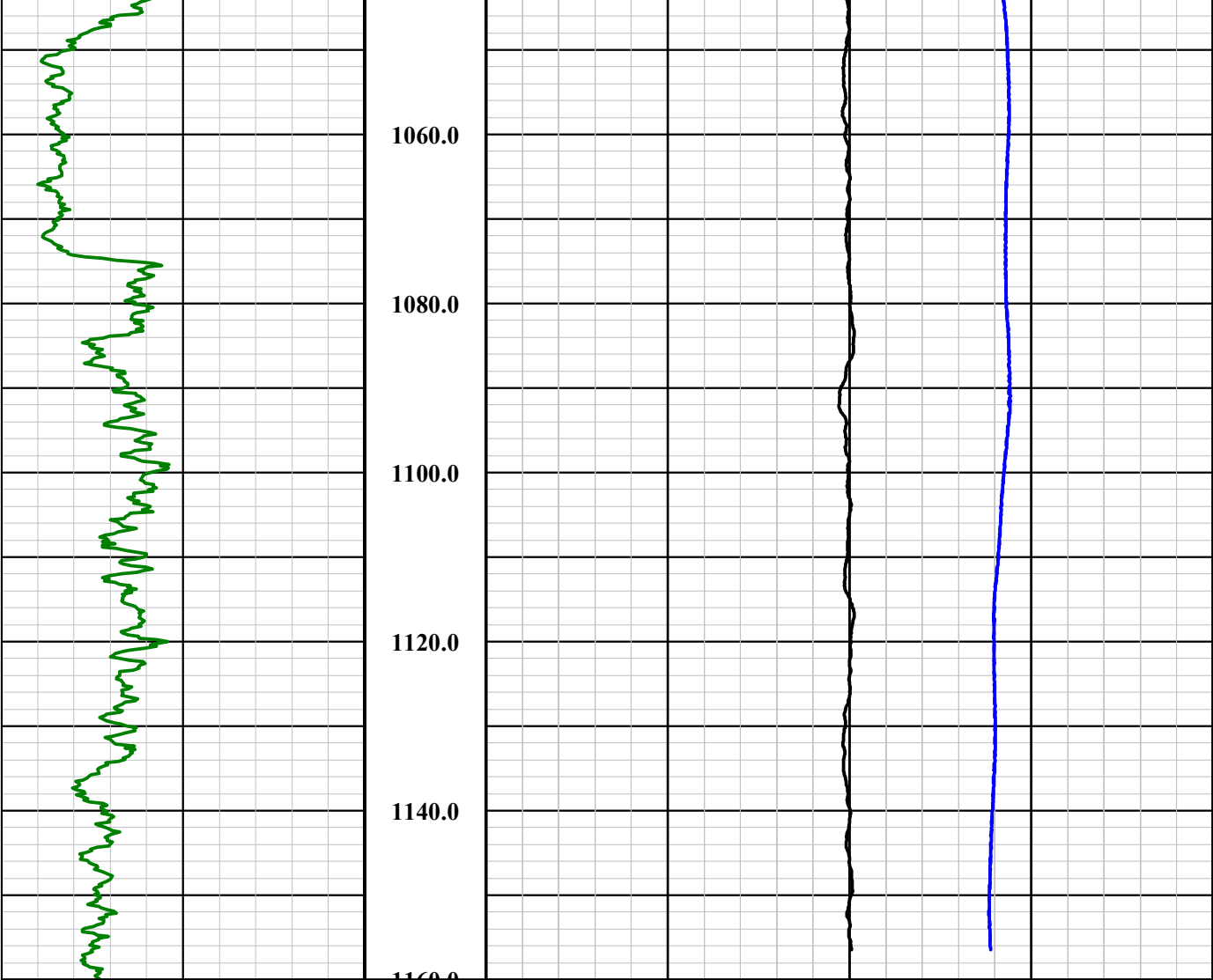
980.0

1000.0

1020.0

1040.0





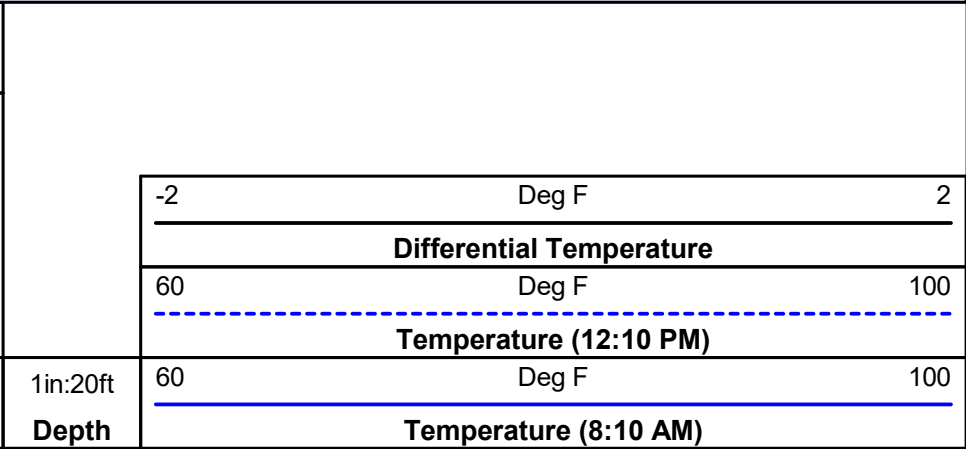
**WB-04 Temperature Evaluation**

0 API 400  

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**Nat. Gamma**  
Base of Lowermost USDW: 300 Ft  
Shut In Time: 24 Hours 0 Min  
Easting (NAD83): 847659.81  
Northing (NAD83): 746131.41  
Elevation: 1478.17 Ft  
Survey Date: 03-13-20  
Well Name: WB-04

**Hole Information**



## **APPENDIX C**

### **Daily Average Flow Rates and Water Level Elevations**



**TABLE 1**  
**DAILY AVERAGE FLOW RATES FOR INJECTION**  
**AND RECOVERY WELLS DURING TEMPERATURE LOGGING**  
 FLORENCE COPPER INC.  
 FLORENCE, ARIZONA

Date	I-01	I-02	I-03	I-04	R-01	R-02	R-03	R-04	R-05	R-06	R-07	R-08	R-09
3/13/2020	56.11	47.01	49.03	46.11	22.01	18.96	13.19	27.01	19.24	16.88	15.07	17.08	74.93

**Notes:**

*All measurements in gallons per minute.*

TABLE 2  
DAILY AVERAGE WATER LEVEL ELEVATIONS  
DURING TEMPERATURE LOGGING  
FLORENCE COPPER INC.  
FLORENCE, ARIZONA

Date	R-01	O-01	O-07	R-02	O-01	O-02	R-03	O-02	O-03	R-04	O-03	R-05	O-04	R-06	O-04	O-05	R-07	O-05	O-06	R-08	O-06	O-07	R-09
3/13/2020	1243.60	1252.15	1249.78	1209.72	1252.15	1249.79	1178.03	1249.79	1255.80	1124.18	1255.80	1189.93	1251.65	1195.14	1251.65	1251.93	1249.11	1251.93	1252.27	1238.37	1252.27	1249.78	1206.93

Notes:  
All measurements in elevation above mean sea level.